Programme Specification

MPhys Physics with Industrial Placement (Honours) 2017-18

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 s/he takes full advantage of the learning opportunities that are provided.

Awarding Institution	University of Southampton
Teaching Institution	University of Southampton
Mode of study	Full Time
Duration in Years	4 Years
Accreditation details	Currently accredited by the Institute of Physics
Final award	Master of Physics (MPhys)
Name of award	Physics with Industrial Placement
Interim Exit awards	*BSc Physics *Diploma of Higher Education *Certificate of Higher Education
FHEQ level of final award	6 (BSc) 7 (MPhys)
UCAS code	N/A
QAA Subject Benchmark or other external reference	QAA Subject Benchmark Statement: Physics, Astronomy & Astrophysics Institute of Physics Accreditation
Programme Coordinator	Dr Matt Himsworth
Date specification was written	3 September 2014
Date specification last updated	11 December 2017

* Only available as exit awards under exceptional circumstances. Note that students must meet the standard criteria for progression to these awards before they can be granted. In the case of the CertHE and DipHE, core modules for the BSc Physics are treated as compulsory modules for the purpose of deciding whether progression to these awards has been accomplished. In the case of the BSc (Physics) exit award, all Part III core modules for the MPhys except the dissertation module (PHYS6009) are treated as compulsory modules for the purpose of deciding whether progression to the BSc awards has been accomplished.

Programme Overview

Brief outline of the programme

MPhys programmes taught at Southampton provide sound and stimulating, as well as supportive, intellectual environment. They aim to provide enjoyable and high quality learning experience, preparing students well for their future professional careers.
In choosing to study physics, you will not only gain in-depth understanding and knowledge of fundamental physics, but also will have the opportunity to appreciate its different aspects and role, in for example, applications or in multi-disciplinary research and technology.
Southampton not only enjoys an outstanding international reputation in all areas of research pursued in Physics and Astronomy, but also for major activity in knowledge and technology transfer towards cutting edge applications. Indeed, University, as a whole, is one of the most successful in the number of spin-off companies that emerged from research carried out in its labs. Therefore, Southampton is particularly well placed to launch its graduates towards successful and wide ranging careers within physics and related fields.
In the final years of MPhys, there are opportunities to study specialist subjects to advanced level as well as develop key scientific research and transferable skills, important for both physics and wider working environment careers. In the 4th year of MPhys, there are also options for students interested in research to pursue projects at the cutting edge of science and learn important experimental and theoretical techniques.

MPhys with Industrial Placement (MPhys with IP) complements those existing schemes within Physics and Astronomy, by offering an opportunity to spend approximately six months working on an original, research and development (R&D) project in an industrial laboratory. It aims to provide students with valuable, practical experience and equip them particularly well for future jobs in industrial research and development.

The placements typically involve working on a project within an industrial laboratory from a specialist area of physics or related technology. Placements will usually be based in companies in or around Southampton, within a commuting distance. This arrangement has several benefits from making practical arrangements easier, reducing settling in time, ensuring easy and effective routes for communication between all parties, to supporting links with local industry, which should also aid students in their further career options.
Typical duration of such placements is six months. They start during Summer Vacation between Years 3 and 4 (typically in July) and last through Semester 1 of Year 4, finishing by Christmas of Year 4. January of Year 4 is mainly devoted to the preparation of a report and a presentation of the project results.
There may be some extra cost involved in the commuting costs during the placements. However, it is a common practice in industry in the UK that students on placements are employed on a short term contract basis, in a role called "Industrial Trainee" and therefore receive some financial remuneration for their work.
Academic staff from Physics and Astronomy will be available, not only to for facilitating placements and the necessary preparation, but as continued support during the project. You will be jointly supervised by a member of academic staff and by a member of the host company. The academic supervisor will visit each student during their placement and will be available to offer advice either remotely or through a meeting.

Please Note: As a research-led University, we undertake a continuous review of our programmes to ensure quality enhancement and to manage our resources. As a result, this programme may be revised during a student's period of registration, however, any revision will be balanced against the requirement that the student should receive the educational service expected. Please read our **Disclaimer** to see why, when and how changes may be made to a student's programme.

Programmes and major changes to programmes are approved through the University's programme validation process which is described in the University's Quality handbook.

Learning and teaching

Core knowledge and understanding is acquired substantially via lectures, supported by tutor-led tutorials, laboratory practical classes, problem classes as well as guided independent study and research. Students are strongly encouraged to attend all the lectures for the courses on which they are registered and are required to attend all the supporting sessions.

For the MPhys with Industrial Placement programme, these learning outcomes are achieved and enhanced through a dissertation, laboratory modules and a placement project.

Assessment

Assessment in Years 1, 2 and 3 is through a mixture of unseen written examinations, marked problem sheets and laboratory work. In Years 2 and 3, while most of the assessment is still mainly by examination, it also includes reports and giving presentations. Semester 1 of Year 4 is assessed completely on the basis of the placement and no other courses are pursued. Semester 2 of Year 4 modules are mostly assessed by written examinations.
Assessment will be carried out through reports, presentation and viva voce examination.

Compared to F303 MPhys Physics, the industrial placement is taken instead of four standard modules in semester 1, and the addition of one standard module in semester 2 of Year 4. The performance on the project is evaluated through assessment of the worked carried out during the placement (35%), dissertation/project report summarising the work (45%) and a viva voce examination (20%). The industrial supervisor will provide an input and a report on a student's performance that will inform the grading of the project work during the placement.

Educational Aims of the Programme

Overall, this programme aims to:

1. introduce you to the main areas of physics
2. support you in gaining in-depth understanding of the principles of physics
3. apply the core knowledge acquired during the first three years of undergraduate degree to the "real world", industrial problems and challenges
4. develop further specialist knowledge, in the area of host company field, building on the physics background learnt earlier
5. appreciate interdisciplinary and intersectorial nature of science and its role in the industrial environment, providing insight and understanding of how physical concepts can be applied to provide technology solutions
6. increase awareness of how physics and other scientific subjects contribute to broader as well as local economy and to society, in general.
7. provide a solid base for a successful career as a physicist, and reinforce skills transferable to a wide range

of other careers
8. reinforce problem solving skills and critical, quantitative data analysis
9. help to develop advanced and specialist laboratory skills using a range of physical techniques, as well as in related disciplines
10. enhance key transferable skills such as personal organisation and teamwork
11. improve your capacity for self-study
12. develop further skills in giving presentation to a professional audience and balancing well the fundamental physics content and the applied side of a project
13. develop further your ability to identify, organise, critically analyse and communicate technical information and concepts through writing a report and a viva voce
14. introduce you to intellectual property and confidentiality issues related to carrying out industrial research and development work.

Programme Learning Outcomes

Knowledge and Understanding

Having successfully completed this programme you will be able to demonstrate good knowledge and understanding of:

A1. mathematics required for the description of the physical world;
A2. the breakdown of classical (19th century) physics and the revolution in physics at the beginning of the 20th century;
A3. special relativity and its application in nuclear physics and high-energy particle scattering;
A4. the quantitative description of oscillating systems and wave-motion;
A5. Newtonian mechanics and its application to physical systems;
A6. quantum theory, both from qualitative and quantitative (quantum mechanics) viewpoints;
A7. application of quantum theory to describe the structure of atoms and nuclei;
A8. the laws of thermodynamics and their consequences for the behaviour of physical systems;
A9. statistical mechanics as a basis for the microscopic description of thermodynamic systems;
A10. electricity, magnetism and their unification through the laws of electromagnetism;
A11. the application of electromagnetism to the description of electromagnetic waves and optics;
A12. advanced classical and quantum mechanics and electromagnetism;
A13. quantum theory applied to relativistic systems;
A14. advanced classical and quantum mechanics and electromagnetism;
A15. specific topics selected for a dissertation and a project carried out in a professional and industrial environment

Teaching and Learning Methods

The topics listed in skills A1–A15 are taught mainly via lectures, directed reading and laboratory work as part of the core modules associated with this programme. Learning is reinforced via tutorials (in Part I), project work (particularly in the final year R&D project), coursework and problems classes.

Assessment methods

The topics listed in skills A1–A15 are assessed via a range of assessment methods. Assessment in the first and second year is a mixture of unseen written examinations, marked problem-based coursework and laboratory work. The third year assessment is mainly by examination, although laboratory-based, computer-based and dissertation modules will use different assessment methods, as appropriate. In the fourth year of this MPhys programme, laboratory work is replaced by a 6 month, full time R&D project which involves the continuous assessment, written reports and an oral examination.

Subject Specific Intellectual and Research Skills

Having successfully completed this programme you will be able to demonstrate understanding of:

B1. apply knowledge of physics to the solution of theoretical and practical physical problems;
B2. apply mathematical techniques in algebra, vectors, calculus and differential equations to the solution of physical problems;
B3. use computers to assist in the solution of physical problems;
B4. interpret data using physics insight and background knowledge and making decisions taking into account experimental errors.

Teaching and Learning Methods

Problem solving (items B1-B3) is at the heart of physics, and so it is emphasized throughout the learning and teaching experience, in lectures, coursework and problem classes. Mathematics skills (item B2) are developed via core maths modules in Part I and the use the techniques learned there in physics core modules in Parts I-III. Computer skills (item B3) are developed via a computing module, which is part of the core laboratory module (PHYS2022) in Part II. They can also be developed via optional modules (e,g, PHYS1202, PHYS6017) and are often developed further and exploited in final year projects. Data analysis, interpretation and associated decision making (item B4) are developed primarily via core laboratory modules in Parts I and II, but also developed further and reinforced in the final year, industrial R&D project, which is also core.

Assessment methods

Problem solving and mathematical skills (items B1-B2) are assessed mostly via written examinations, but also via assessed coursework, especially in Parts I and II of the programme. Problem-solving (B1), in particular, is also a key aspect of the R&D project, which is assessed via a judgment of research work, a written report, evaluated by two examiners, and an oral examination. The computing part of the core laboratory (B3) module in Part II is assessed via practical exercises. Data interpretation and related decision making (B4) are assessed via practical work, vivas and presentations in the Part 1-3 laboratory modules. They are also assessed implicitly in the industrial R&D project.

Transferable and Generic Skills

Having successfully completed this programme you will be able to:

C1. communicate physical ideas in written form;
C2. recognise the value of numeracy in the precise statement of ideas;
C3. prepare and give an oral presentation using visual aids;
C4. display data graphically and undertake basic word processing, including mathematical equations;
C5. use information from a variety of sources including scientific journals, books and the internet;
C6. manage a project with due attention to time and resource management;
C7. work successfully as a team member.

Teaching and Learning Methods

Skill C1 is covered mainly via self-study (with help and feedback available) in the Physics Skills/Physics from Evidence lab modules (via write-ups), in the final year project (which is partly assessed via a written report), and the dissertation module. Skill C2 is embedded throughout the curriculum, with practical applications in experimental and project work. Skill C3 is covered the Part II Physics from Evidence laboratory module, which includes a “conference” component, during which students give an assessed presentation on your laboratory work at a mock scientific conference. It is also covered in the dissertation module, which includes a presentation associated with the teamwork component. Skill C4 is covered in laboratory and the industrial project work, as well as the dissertation module. Skill C5 is covered by the final year project, as well as the dissertation module. Skill C6 is developed especially during the industrial project, but also during the dissertation module. Skill C7 is developed during all lab modules, during the industrial project, and particularly during the dissertation module (which includes a team work component).

Assessment methods

Skill C1 is assessed with written reports on experimental work in laboratory modules, via the written report required for the industrial R&D project, and via the written report required for the dissertation module. Skill C2 is assessed in a variety of ways throughout the programme – it is an ingredient in everything from formal exams, to oral examinations, to written reports and presentations. Skill C3 is assessed via a presentation students give during a mock scientific conference which is part of the Part II Physics from Evidence laboratory module. Skill C4 is assessed in the marking of all written coursework and reports, such as laboratory and project work, and also the report for the dissertation module. Skill C5 is assessed as an explicit component in the mark scheme for the industrial project report, and also in the report for the dissertation module. Skill C6 is assessed primarily via the supervisor's and the module coordinator evaluation on the project performance, but of course also via the report on the project and on the topic selected in the dissertation module. Skill C7 is assessed explicitly via the team work component **of the dissertation module. Two examiners assess each group’s scientific presentation of the topic that the team has worked on and brief summaries/abstracts of their main findings.**

Furthermore, the group work is assessed in the industrial project, where the students typically work as a member of a team. The mark for this is assigned by the module coordinator, informed by a discussion and informal evaluation by the industrial supervisor.

Subject Specific Practical Skills (optional)

Having successfully completed this programme you will be able to:

D1. use standard laboratory apparatus for physical measurements;
D2. use computers for the acquisition, storage, and analysis of data.

Skill D1 is developed and assessed primarily via the core laboratory modules in Parts I and II and is often also assessed through the industrial project. Skill D2 is developed and assessed during the laboratory modules, especially the Part II Physics from Evidence module, which includes a computing component. This skill is frequently assessed as a part of the industrial project.

Graduate Attributes

Graduate Attributes are the personal qualities, skills and understanding you can develop during your studies. They include but extend beyond your knowledge of an academic discipline and its technical proficiencies. Graduate Attributes are important because they equip you for the challenge of contributing to your chosen profession and may enable you to take a leading role in shaping the society in which you live.

We offer you the opportunity to develop these attributes through your successful engagement with the learning and teaching of your programme and your active participation in University life. The skills, knowledge and personal qualities that underpin the Graduate Attributes are supported by your discipline. As such, each attribute is enriched, made distinct and expressed through the variety of learning experiences you will experience. Your development of Graduate Attributes presumes basic competencies on entry to the University.

There are six Graduate Attributes:

1 Global Citizenship

Global Citizens recognise the value of meaningful contribution to an interconnected global society and aspire to realise an individual's human rights with tolerance and respect.

2 Ethical Leadership

Ethical Leaders understand the value of leading and contributing responsibly to the benefit of their chosen professions, as well as local, national and international communities. Good academic practice is taught and enforced throughout, including automatic checks of plagiarism

3 Research and Inquiry

Research and Inquiry underpin the formulation of well-informed new ideas and a creative approach to problem resolution and entrepreneurial behaviours

4 Academic

Academic attributes are the tools that sustain an independent capacity to critically understand a discipline and apply knowledge

5 Communication Skills

Communication Skills encompass an individual's ability to demonstrate knowledge, and to express ideas with confidence and clarity to a variety of audiences

6 Reflective Learner

The Reflective Learner is capable of the independent reflection necessary to develop their learning and continuously meet the challenge of pursuing excellence

The following table shows the mapping between the University's Graduate Attributes, and a selected subset of the core*, compulsory+ and optional modules that form or are available during the degree programme.

Code	Module Title	1	2	3	4	5	6
		Global citizenship	Ethical leadership	Research and Enquiry	Academic	Communication Skills	Reflective Learner
PHYS1017*	Physics Skills I			●	●	●	●
PHYS1019*	Physics Skills II			●	●	●	●
PHYS1028*	Personal Tutorial	●	●	●	●	●	●
PHYS2007	Medical Physics		●		●		
PHYS2015	Introduction to Energy & the Environment	●	●		●		
PHYS2022*	Physics from Evidence I			●	●	●	●
PHYS3018*	Final Year Project			●	●	●	●
PHYS3017+	Final Year Synoptic Exam			●	●	●	●
PHYS3019	Communicating & Teaching and The Undergraduate Ambassadors Scheme	●	●			●	●
PHYS3009	Applied Nuclear Physics		●	●	●		
PHYS6027	Industrial Placement	●	●			●	

Programme Structure

Typical course content

We offer both Single and Combined Honours degree programmes; the former is a state of the art introduction to modern physics whilst the latter is aimed at students wishing to become professional physicists, either by moving onto a PhD or in Industry. In practice there is considerable flexibility to change from single honours to combined honours and vice versa, especially in the first year of your degree.

All the degree programmes that we offer are based on a core of essential fundamental physics courses supplemented by a range of optional courses (making up 25% of the course). The optional courses can be chosen to cover a broad range of topics such as 'Physics of the Solar System', 'Medical Physics', and 'Energy and the Environment'. Alternatively, options can be chosen to develop a coherent pattern of study in areas in which we have particular strengths either within the School or elsewhere in the University. These include Astronomy, Space Science, Photonics, NanoScience, Theoretical Physics and Mathematics, Computer Science, and Oceanography. You will also have the opportunity to choose optional modules in a wide range of subjects, from Business Skills and Economics to Ethics and Global Health.

The structure of this MPhys degree programme allows you to exercise choice in at least 2 modules in each year of study. You can exercise this choice in a number of ways.

· You can use these modules to deepen your knowledge of your main subject.

· You can combine additional modules from your main subject with modules from other disciplines or choose from a selection of interdisciplinary modules.

It should be noted that it may not be possible to run some optional modules if the number of students registered on the module is very small. It should also be noted that optional module choice can be restricted by the University Timetable, which varies from year to year: some optional modules may clash with other optional or compulsory modules. Please be aware that many modules are shared between different cohorts; the class size depends on cohort size, which varies from year to year.

Special Features of the programme

Students can transfer easily between the BSc (Physics) and MPhys programmes until the end of Part II. High-performing students are also eligible to apply this “flagship” programmes, which are not available for direct entry. The final year of the MPhys with Industrial Placement, namely the first semester of the final year, is spent performing a full time research project either in an academic research group or in a local industrial partner.

Space on these programmes is strictly limited, and only students typically achieving first or 2.1 class marks are eligible to apply for entry onto these programmes. Students will formally join the Programme at the end of Part III, once accepted into placements and not before the 1st of July. Students who did not progress to Part IV by that date will be disqualified from the Programme.

Programme details

The information in this programme specification is accurate at the time of writing, but may change in minor ways from year to year due to staff availability or other factors. Some of these modules are subject to pre-requisites and exclusions that, for brevity, are not given here; this information is available in the module specifications on the Physics & Astronomy Undergraduate Teaching website.

The module requirements for each programme are shown for each Part below; modules are either core (must be taken and passed), compulsory (must be taken) or optional (may be taken).

MPhys with Industrial Placement - Programme Structure

Part 1

Semester 1		ECTS	FHEQ		Semester 2		ECTS	FHEQ	
PHYS1015	†	5	4	Motion and relativity	PHYS1011	†	5	4	Waves, light & quanta
PHYS1017	†	5	4	Physics Skills 1	PHYS1013	†	5	4	Energy & matter
PHYS1022	†	5	4	Electricity and Magnetism	PHYS1019	†	5	4	Physics Skills 2
MATH1006	†	7.5	4	Introduction to Mathematical Methods	MATH1007	†	7.5	4	Mathematical Methods for Physical Science
OPTION		7.5	4/5	1 option module	OPTION		7.5	4/5	1 option module

Part 2

Semester 1		ECTS	FHEQ		Semester 2		ECTS	FHEQ	
PHYS2003	†	7.5	5	Quantum Physics	PHYS2001	†	7.5	5	Electromagnetism
PHYS2022	†	7.5	5	Physics from Evidence 1	PHYS2006	†	7.5	5	Classical Mechanics
PHYS2023	†	7.5	5	Wave Physics	PHYS2024	†	7.5	5	Quantum Physics of Matter
OPTION		7.5	4/5/6	1 option module	OPTION		7.5	4/5/6	1 option module

Part 3

Semester 1		ECTS	FHEQ		Semester 2		ECTS	FHEQ	
PHYS3004	†	7.5	6	Crystalline Solids	PHYS3002	†	7.5	6	Nuclei & Particles
PHYS3008	†	7.5	6	Atomic Physics	PHYS3007	†	7.5	6	Theories of Matter, Space and Time
PHYS6009	‡	7.5	7	Dissertation	PHYS6008 or	‡	7.5	7	Physics from Evidence 2
					PHYS6017	‡	7.5	7	Computer Techniques
OPTION		7.5	5/6/7	1 option module	OPTION		7.5	5/6/7	1 option module

Part 4

Semester 1		ECTS	FHEQ		Semester 2		ECTS	FHEQ	
PHYS6027	†	30	7	Industrial Placement	PHYS6015	‡	7.5	7	MPhys Synoptic Exam
					OPTION		7.5	7	1 option module
					OPTION		7.5	6/7	1 option module
					OPTION		7.5	6/7	1 option module

FHEQ levels for options are illustrative, other configurations are possible, but must meet university regulations on forward/back-tracking, and final ECTS accumulation for award (http://www.calendar.soton.ac.uk/sectionIV/cats.html)

Status † Core module - must be taken and passed before progression to next level or award
‡ Compulsory module - must be taken before progression to next level or award

Additional Costs

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. Costs that students registered for this programme typically also have to pay for are included in Appendix 2.

Progression Requirements

These programmes follow the University's regulations for ***Progression, Determination and Classification of Results: Undergraduate and Integrated Masters Programmes*** as set out in the University Calendar, except where explicitly indicated otherwise in the ***Academic Regulations specific to the BSc (Physics)*** or ***MPhys*** programmes, which are also listed in the University Calendar.

Intermediate exit points (where available)

You will be eligible for an interim exit award if you complete part of the programme but not all of it, as follows:

Qualification	Minimum overall credit in ECTS credits	Minimum ECTS Credits required at level of award
BSc (Physics)*	at least 180	45
Diploma of Higher Education	at least 120	45
Certificate of HE	at least 60	45

* Only available for students who have completed Part III of the MPhys programme.

Exit awards are available only under exceptional circumstances. Note that students must meet the standard criteria for progression to these awards before they can be granted. In the case of the CertHE and DipHE, core modules for the BSc Physics are treated as compulsory modules for the purpose of deciding whether progression to these awards has been accomplished. In the case of the BSc (Physics) exit award, all Part III core modules for the MPhys except the dissertation module (PHYS6009) are treated as compulsory modules for the purpose of deciding whether progression to the BSc awards has been accomplished.

Support for student learning

There are facilities and services to support your learning some of which are accessible to students across the University and some of which will be geared more particularly to students in your particular Faculty or discipline area.

The University provides:

- library resources, including e-books, on-line journals and databases, which are comprehensive and up-to-date; together with assistance from Library staff to enable you to make the best use of these resources
- high speed access to online electronic learning resources on the Internet from dedicated PC Workstations onsite and from your own devices; laptops, smartphones and tablet PCs via the Eduroam wireless network. There is a wide range of application software available from the Student Public Workstations. Students can also access SVE (Southampton Virtual Environment), a virtual Windows University of Southampton desktop that can be accessed from personal devices such as PCs, Macs, tablets and smartphones from any location.

- computer accounts which will connect you to a number of learning technologies for example, the Blackboard virtual learning environment (which facilitates online learning and access to specific learning resources)
- standard ICT tools such as Email, secure filestore and calendars.
- access to key information through the MySouthampton Student Mobile Portal which delivers timetables, Module information, Locations, Tutor details, Library account, bus timetables etc. while you are on the move.
- Central IT support is provided through a comprehensive website, telephone and online ticketed support and a dedicated helpdesk in the Hartley Library foyer
- Enabling Services offering assessment and support (including specialist IT support) facilities if you have a disability, dyslexia, mental health issue or specific learning difficulties
- the Student Services Centre (SSC) to assist you with a range of general enquiries including financial matters, accommodation, exams, graduation, student visas, ID cards
- Career Destinations, advising on job search, applications, interviews, paid work, volunteering and internship opportunities and getting the most out of your extra-curricular activities alongside your degree programme when writing your CV
- a range of personal support services : mentoring, counselling, residence support service, chaplaincy, health service
- a Centre for Language Study, providing assistance in the development of English language and study skills for non-native speakers.

The Students' Union provides:

- an academic student representation system, consisting of Course Representatives, Academic Presidents, Faculty Officers and the Vice-President Education; SUSU provides training and support for all these representatives, whose role is to represent students' views to the University.
- opportunities for extracurricular activities and volunteering
- an Advice Centre offering free and confidential advice including support if you need to make an academic appeal
- Support for student peer-to-peer groups, such as Nightline.

Associated with your programme you will be able to access:

- All students have a personal tutor, with whom they meet regularly, particularly during the first year where small group tutorials are used to discuss the core physics courses and associated coursework/problem sheets. Tutors offer help on both academic matters, such as choice of option courses, and on pastoral matters.
- The Year Directors of Studies, the Director of Programmes, as well as the Senior Tutor are available to give help and advice as required.
- One of the primary functions of the Faculty Office is student support and guidance. The Faculty Office is able to provide information on wide range of topics, including programme regulations, special consideration procedures, appeals, and much more.
- The student physics society Physoc organizes a "parenting" scheme in which all new arrivals are looked after by senior physics students. Physoc also runs an academic mentoring scheme that aims to provide academic tutoring, help and advice for students by students.
- In the first and second year, each core module has an associated compulsory problems class where demonstrator provide individual help on the course material and/or coursework;
- Students normally work in pairs on final year projects, which are supervised by a member of academic staff who is likely to be an internationally respected expert.
- Most modules provide printed lecture notes that are either distributed or are available online.
- Key transferable skills are embedded throughout our courses, particularly those which contain coursework or laboratory work.
- Provision is made for any student who specifically wishes to consult a female member of staff.
- We are proud of the friendly atmosphere in Physics & Astronomy. Members of staff are happy to be approached for help. The Faculty Office also provides support for students throughout their programmes.

Methods for evaluating the quality of teaching and learning

You will have the opportunity to have your say on the quality of the programme in the following ways:

- Completing student evaluation questionnaires for each module of the programme

- Acting as a student representative on various committees, e.g. Staff: Student Liaison Committees, Faculty Programmes Committee OR providing comments to your student representative to feed back on your behalf.
- Serving as a student representative on Faculty Scrutiny Groups for programme validation
- Taking part in programme validation meetings by joining a panel of students to meet with the Faculty Scrutiny Group

The ways in which the quality of your programme is checked, both inside and outside the University, are:

- Annual module and programme reports which are monitored by the Faculty
- Programme validation, normally every five years.
- External examiners, who produce an annual report
- Regular inspections and accreditation by the Institute of Physics
- A national Research Excellence Framework (our research activity contributes directly to the quality of your learning experience)
- Higher Education Review by the Quality Assurance Agency

Criteria for admission

University Commitment

The University will at all times seek to operate admissions regulations that are fair and are in accordance with the law of the United Kingdom, and the University's Charter, Statutes, Ordinances and Regulations.

This includes specific compliance with legislation relating to discrimination and the University's Equal Opportunities Policy Statement. This includes a commitment that the University will:

- actively assist groups that experience disadvantage in education and employment to benefit from belonging to the University
- actively seek to widen participation to enable students that do not traditionally participate in Higher Education to do so;
- ensure that admission procedures select students fairly and appropriately according to their academic ability and that the procedure is monitored and regularly reviewed.

The main aim of this industrial placement is to enable students with first class or 2:1 grades to take part in industrial research. This scheme can be particularly beneficial to those considering careers in industry or in pursuing graduate research.

Entry Requirements

At the beginning of Part III, the students wishing to pursue MPhys with IP should contact the programme coordinator to express their interest. While it is not mandatory, the students considering this programme are encouraged to take the optional laboratory or computing modules, such as Introduction to Photonics (PHYS1004), Practical Photonics (PHYS2009) and Techniques in Physics (PHYS6008)

In Year 3, placement opportunities will be announced and with the assistance of the MPhys with IP coordinator, you will be able to apply for such positions. The placements are not guaranteed and are offered on a competitive basis and on academic merit. During the first two and a half years of their study, the students wishing to be admitted to this Programme would need to be performing at a level which indicates that they are on track to graduate with first class or 2:1 degree. In order to secure a placement you will need to successfully pass an interview with the relevant industrial partner and receive a positive report from your tutor. Please note that there will be a limited number of placements available.

Students will formally join the Programme at the end of Part III, once accepted into placements and not before the 1st of July. Students who have not progressed to Part IV by that date will be disqualified from the Programme.

Career Opportunities

Careers Support

We believe in helping our students gain the necessary experience for a future career, along with the skills to identify opportunities and make the most of them. At Southampton, you will have the opportunity to broaden your options by meeting employers, getting involved in volunteering activities, work placements and much more.

We work hard to help our students enter exciting careers. Our Academic Careers Team, supported by our student society (PHYSOC), put on over 40 hours a year of careers advice ranging from helping you write your CV, to advice on how to set up a small business, to mock interviews supported by real companies. We work with our students to find them placements and internships, which will help them to gain valuable work experience, preparing them for employment when they graduate. In 2012, 86% of our students began a career within six months of graduating.

We offer our top performing students to chance to join one of our flagship programmes, which allows them to work at research centres in leading Universities overseas, such Harvard University, or for world renowned research centres such as CERN, where scientists recently discovered the Higgs Boson. One of the flagship programmes, the MPhys with Industrial Placement, provides students with the opportunity to spend a full semester working on physics-related topics in a company.

We are part of South East Physics Network (SEPNet,) who we work with to organise eight-week paid internships for our students during the summer vacation. In previous years, students have been placed with a wide range of organisations, including The National Physical Laboratory, BMW, The Met Office, SELEX Galileo, QinetiQ, the Culham Centre for Fusion Energy. As well as offering employment opportunities, these companies offer advice to our students about how to become more competitive in the work place.

SEPNet has a dedicated Careers Adviser who our students can liaise with. We work with SEPNet to offer our students the chance to attend 'meet the employer' days as well as careers talks with speakers from industry.

External Examiners(s) for the programme

Parts I and II
Name: Professor Simon Cornish
Institution: Durham University

Parts III and IV
Name: Professor Andrew Norton
Institution: The Open University

Students must not contact external examiners directly, and external examiners have been advised to refer any such communications back to the University. Students should raise any general queries about the assessment and examination process for the programme with their Course Representative, for consideration through Staff: Student Liaison Committee in the first instance. Student representatives on Staff: Student Liaison Committees will have the opportunity to consider external examiners' reports as part of the University's quality assurance process.

External examiners do not have a direct role in determining results for individual students, and students wishing to discuss their own performance in assessment should contact their personal academic tutor in the first instance.

Please note: 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 s/he takes full advantage of the learning opportunities that are provided. More detailed information can be found in the programme handbook (or other appropriate guide) or online at http://www.fpse.soton.ac.uk/student_handbook.

Appendix 1:

Programme Learning Outcome Mapping

The following table shows the mapping of core and compulsory modules to programme learning outcomes:

		Knowledge and Understanding															Subject Specific Intellectual Skills				Transferable/Key Skills						
Module Code	**Module Title**	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	B1	B2	B3	B4	C1	C2	C3	C4	C5	C6	C7
PHYS1015	Motion & Relativity		●	●	●	●											●	●			●	●					
PHYS1017	Physics Skills I											●										●		●		●	●
PHYS1022	Introduction to Electromagnetism										●						●	●			●	●					
MATH1006	Introduction to Mathematical Methods	●																				●					
PHYS1011	Waves, Light and Quanta		●				●										●	●			●	●					
PHYS1013	Energy & Matter								●								●	●			●	●					
PHYS1019	Physics Skills II											●								●		●		●		●	●
MATH1007	Mathematical Methods for Physical Science	●																				●					
PHYS2006	Classical Mechanics					●											●	●			●	●					
PHYS2022	Physics from Evidence I											●							●	●		●	●	●		●	●

PHYS2023	Wave Physics	●			●		●									●	●			●	●						
PHYS2001	Electromagnetism										●		●				●	●			●	●						
		Knowledge and Understanding															**Subject Specific Intellectual Skills**				**Transferable/Key Skills**							
Module Code	**Module Title**	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	B1	B2	B3	B4	C1	C2	C3	C4	C5	C6	C7
PHYS2003	Quantum Physics						●	●									●	●			●	●					
PHYS2024	Quantum Physics of Matter									●							●	●			●	●					
PHYS3004	Crystalline Solids									●							●	●			●	●					
PHYS3008	Atomic physics							●									●	●			●	●					
PHYS6009	Dissertation															●	●			●	●	●	●	●	●	●	●
PHYS3002	Nuclei and Particles			●			●	●									●	●			●	●					
PHYS3007	Theories of Matter, Space & Time			●			●				●		●	●	●		●	●			●	●					
PHYS6008	Physics from Evidence II												●							●	●	●		●		●	●
PHYS6017	Computer Techniques																		●		●	●		●		●	
PHYS6015	MPhys Final Year Synoptic Exam	●	●	●	●	●	●	●	●	●	●						●	●			●	●					
PHYS6027	Industrial R&D project															●	●	●	●	●	●	●	●	●	●	●	●

Assessment

Module Code	Module Title	Coursework 1	Coursework 2	Coursework 3	Coursework 4	Coursework 5	Exam
PHYS1015	Motion and Relativity	Problem Sheets (20%)	Mid Semester Test (10%)				Examination (70%)
PHYS1017	Physics Skills 1	Laboratory Work (100%)					No exam
PHYS1022	Electricity and Magnetism	Mastering Physics Exercise (20%)	Mid Semester Test (10%)				Examination (70%)
PHYS1004	Introduction to Photonics	Problem Sheets (36%)	Laboratory work (39%)	In class test 1 (12.5%)	In class test 2 (12.5%)		No exam
MATH1006	Introduction to mathematical methods	Problem Sheets (10%)	Mid Semester coursework (10%)				Examination (80%)
PHYS1011	Wave Light and Quanta	Problem Sheets (20%)	Mid Semester Test (10%)				Examination (70.0 %)
PHYS1013	Energy and Matter	Problem Sheets (20%)	Mid Semester Test (10%)				Examination (70.0 %)
PHYS1019	Physics Skills 2	Laboratory Work (100%)					No exam
PHYS1026	Introduction to the nanoworld	Mid Semester Test (25%)					Examination (75%)
MATH1007	Mathematical Methods for physics scientists	Problem sheets (20%)					Examination (80%)
PHYS2003	Quantum Physics	Problem sheets (20%)					Examination (80.0 %)
PHYS2022	Physics from Evidence I	Computing Coursework (35%)	Laboratory Work (55%)	Conference Pres (10%)			No exam
PHYS2023	Wave Physics	Problem sheets (20%)					Examination (80%)
PHYS2001	Electromagnetism	Problem sheets (20%)					Examination (80%)
PHYS2006	Classical Mechanics	Problem Sheets (20%)					Examination (80%)

PHYS2024	Quantum Physics of Matter	Problem sheets (20%)					Examination (80%)
PHYS2009	Practical Photonics	Dissertation (40%)	Practicals (60%)				No exam
PHYS3003	Light & Matter						Examination (100%)
PHYS3004	Crystalline Solids	Problem sheets (10%)					Examination (90%)
PHYS3008	Atomic Physics	Problem sheets (10%)					Examination (90%)
PHYS6009	Dissertation	Team work abstract (15%)	Dissertation report (60%)	Conference pres (25%)			No exam
PHYS3002	Nuclei & Particles	Problem Sheets (10%)					Examination (90%)
PHYS3007	Theories of Matter Space & Time	Problem sheets (10%)					Examination (90%)
PHYS6008	Physics from Evidence II	Micro project (16%)	4 scripted experiments (64%)	Poster pres (20%)			No exam
PHYS6017	Computer Techniques in Physics	Project report 1 (50%)	Project report 2 (50%)				No exam
PHYS6027	R&D project for Industrial placement	Practical work (35%)	Report (45%)	Viva (20%)			No exam
PHYS6015	MPhys Final Year Synoptic Exam	Project (20%)					Examination (80%)

Appendix 2:

Additional Costs

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. In addition to this, students registered for this programme typically also have to pay for the items listed in the table below.

In some cases you'll be able to choose modules (which may have different costs associated with that module) which will change the overall cost of a programme to you. Details of such costs will be listed in the Module Profile. Please also ensure you read the section on additional costs in the University's Fees, Charges and Expenses Regulations in the University Calendar available at www.calendar.soton.ac.uk.

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
Approved Calculators		Candidates may use calculators in the examination room only as specified by the University and as permitted by the rubric of individual examination papers. The University approved models are Casio FX-570 and Casio FX-85GT Plus. These may be purchased from any source and no longer need to carry the University logo.
Stationery		You will be expected to provide your own day-to-day stationary items, e.g. pens, pencils, notebooks, etc). Any specialist stationery items will be specified under the Additional Costs tab of the relevant module profile.
T**extbooks**		Where a module specifies core texts these should generally be available on the reserve list in the library. However due to demand, students may prefer to buy their own copies. These can be purchased from any source.

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
		Some modules suggest reading texts as **optional** background reading. The library may hold copies of such texts, or alternatively you may wish to purchase your own copies. Although not essential reading, you may benefit from the additional reading materials for the module.
Equipment and Materials **Equipment**	Art Equipment and Materials: Drawing paper; painting materials; sketchbooks	
	Art Equipment and Materials: Fabric, Thread, Wool	
	Design equipment and materials:	
	Excavation equipment and materials:	
	Field Equipment and Materials:	
	Laboratory Equipment and Materials:	
	Medical Equipment and Materials: Fobwatch; stethoscopes;	
	Music Equipment and Materials	
	Photography:	
	Recording Equipment:	

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
IT	Computer Discs	
	Software Licenses	
	Hardware	
Clothing	Lab Coats	
	Protective Clothing: Hard hat; safety boots; hi-viz vest/jackets;	
	Fieldcourse clothing:	
	Wet Suits?	
	Uniforms?	
Printing and Photocopying Costs		In the majority of cases, coursework such as essays; projects; dissertations is likely to be submitted on line. However, there are some items where it is not possible to submit on line and students will be asked to provide a printed copy.
Fieldwork: logistical costs	Accommodation:	
	Insurance	
	Travel costs	

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
	Immunisation/vaccination costs	
	Other:	
Placements (including Study Abroad Programmes)	Accommodation	PHYS6027: Please note that students are required to pay for their accommodation costs.
	Insurance	PHYS6027: Please note that students are responsible for their own vehicle insurance cost if applicable.
	Medical Insurance	
	Travel costs	PHYS6027: Students Costs for the module: Please note that students are required to pay for their travel costs to and from the schools they work with during the module.
	Immunisation/vaccination costs	
	Disclosure and Barring Certificates or Clearance	
	Translation of birth certificates	
	Other	
Conference expenses	Accommodation	
	Travel	
Optional Visits (e.g. museums, galleries)		
Professional Exams		

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
Parking Costs		
Anything else not covered elsewhere		

Revision History

1. New format based on revisions approved by Senate 19 June 2013 as part of new programme validation process. Minor changes made to form guidance on completion of Intended Learning Outcomes, and Learning outcomes and Assessment Mapping document template, for clarity; and changes to wording of support for student learning section, altering to second person throughout – agreed with the Chair and to be reported to UPC October 2013
2. Converted existing programme specifications for BSc (Physics) and MPhys to new format, along with minor updates and changes. CK20140812
3. Updated by MK and AJB, Oct 2014
4. Update to Programme Overview (CMA Changes) – 24 August 2015
5. Update to Programme Overview (CMA Changes) – 14 September 2015
6. Update to Additional Cost Table – 12 October 2015
7. Updated for 16/17 (FPC) – 24 February 2016
8. Update to Programme Structure – optional module viability (CQA) – 07 December 2016
9. Updated for 17/18 (FPC) – 8 March 2017
10. Transfer date amended to 01 July and approved by FPC – 29 November 2017.
11. FPC approved optional module size caveat – CQA Team 11 December 2017