Programme Title: MSci Physics with Professional Experience

Programme Specification (UG)

Awarding body / institution:	Queen Mary University of London
Teaching institution:	Queen Mary University of London
Name of final award and programme title:	Master in Science (MSci) Physics with Professional Experience
Name of interim award(s):	
Duration of study / period of registration:	5 years
QMUL programme code / UCAS code(s):	F390
QAA Benchmark Group:	Physics
FHEQ Level of Award :	Level 7
Programme accredited by:	Not yet accredited. Will seek accreditation from Institute of Physics as soon as the programme is approved.
Date Programme Specification approved:	
Responsible School / Institute:	School of Physics and Astronomy

Schools / Institutes which will also be involved in teaching part of the programme:

Collaborative institution(s) / organisation(s) involved in delivering the programme:

Level 7 modules can be taken at our intercollegiate institutions: KCL, UCL & RHUL

Programme outline

This programme follows the syllabus of the Institute of Physics (IoP) accredited MSci in Physics. The programme covers the whole of the "core of Physics" as specified by the IoP in the compulsory modules and is structured to allow for increasing module choice in the second, third and fourth years of study. An MSci graduate should be able to enter further training at MSc or PhD level or enter any of a number of other careers which use the transferable skills gained during their studies. This progamme last 5 years and students will be supported to apply for a professional experience position with an external company or laboratory for their fourth year of study. This professional experience year will be competitively applied for with external organizations. If a student fails to secure an external position, then it may be possible for them to apply for an unpaid internship within the School for a duration of less than 12 months.

Aims of the programme

We aim to:
i. teach physics of high quality within an excellent research environment;
ii. recruit students able to benefit from a university education;

iii. provide a programme that enables students with a variety of educational backgrounds to pursue physics as a subject;
iv. provide access to such variety of modules, including those from other disciplines, as to enable students to tailor their studies to their own needs and interests;
v. instill in our students an understanding of the working of the physical world;
vi. encourage students to develop transferable skills that are applicable to a variety of careers;
vii. provide a programme that prepares students, where appropriate, for a range of professional careers in physics.
viii. provide opportunities for students to appreciate the beauty of physics and to develop a desire for learning.
ix. provide opportunities for students to prepare for the workplace and apply for a professional experience year that may give a vocational education aspect to complement academic studies.

What will you be expected to achieve?

Students successfully completing this programme will be expected to achieve the outcomes listed below.

Please note that the following information is only applicable to students who commenced their Level 4 studies in 2017/18, or 2018/19

In each year of undergraduate study, students are required to study modules to the value of at least 10 credits, which align to one or more of the following themes:

- networking
- multi- and inter-disciplinarity
- international perspectives
- enterprising perspectives.

These modules will be identified through the Module Directory, and / or by your School or Institute as your studies progress.

Academic Content:	
A 1	Have acquired a core knowledge of physics.
A 2	Be able to communicate this knowledge.
A 3	Have acquired essential skills in the use of computers for word-processing, spreadsheet computing and the acquisition and manipulation of data.
A 4	Have acquired essential skills in measurement and the analysis of uncertainties of observation.

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Disciplinary Skills - able to:	
B 1	Have acquired essential skills in the art of scientific report-writing and in the oral presentation of technical material.
B 2	Be able to apply scientific methods to the analysis of problems.
B 3	Have seen and understood the application of core physics to one or two specialised areas of study.
B 4	Have acquired an understanding of the workings of the physical world.
B 5	Be able to appreciate the role of science in general, and of physics in particular, within a broader range of human cultural activity.

Attributes:	
C 1	To acquire and apply knowledge in a rigorous way.
C 2	To connect information and ideas within their field of study.
C 3	To adapt their understanding to new and unfamiliar settings.
C 4	To develop the ability to reflect upon and asses their own progress.

How will you learn?

Our programme is constructed within a modular course structure in which each student takes eight or nine modules per year. Our overall strategy is to achieve a balance, appropriate to the aims of each course unit, between teaching (lectures; practical laboratory work; small-group tutorials) and learning by students (peer discussion; exercise classes; coursework and essay assignments; independent work in laboratories and computer studies; teach-yourself computer packages and the Internet; videos; textbooks and supplementary reading).

Exercise classes or laboratories are provided for all compulsory modules which are used to develop the specific skills needed. Two general physics laboratories are used to develop experimental skills, including the acquisition of data and the analysis of uncertainties of observation. In addition students learn to write a scientific account of their experimental observation. Finally, a compulsory project is used to develop students' investigative and communication skills.

How will you be assessed?

Assessment is by a mixture of continuous assessment and formal written examinations at the end of each year. We use a variety of in-course assessments to enable students to get quick feedback as to their performance. These include weekly coursework (marked and returned on a weekly basis), essay assignments, mid-term tests carried out in a lecture slot, performance in exercise classes and tutorials, laboratory and project reports. These in-course assessments are combined with formal final written examination results and oral examinations (on project modules) to produce the final mark for each course unit. The precise mixture of in-course and final exam marks to give the overall mark varies between different course units and is specified in the detailed course unit description given in the Student Handbook and on the relevant QMPlus module web page.

Assessment for the professional experience year will be conducted in conjunction with the external employer but will not contribute to the final degree award from QMUL.

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How is the programme structured?

Please specify the structure of the programme diets for all variants of the programme (e.g. full-time, part-time - if applicable). The description should be sufficiently detailed to fully define the structure of the diet.

The programme consists of compulsory and elective modules. All undergraduate students at Queen Mary take 120 credits a year. A MSci degree consists of 480 credits. Most modules are worth 15 credits which means that students normally take 8 modules a year. Students are required to take all modules marked as 'compulsory'.

In the fifth year students are required to study for a project worth 45 credits or elect to take a 30 credit module, allowing them to take an additional taught module. One of the two final year project module options must be studied in order to obtain a degree (Physics Investigative Project, or Physics Research Project). Here the 30 credit project (SPA7015U) is normally taken. Where modules are indicated as "elective", students may choose whether or not to take the module.

Where there is space in the curriculum students at level 5 and 6 may take up to 15 credits per academic year from another School at Queen Mary. Students who chose this option are responsible for finding their own modules and complying with all registration requirements. Students at level 4 should choose from one of the SPA level 4 modules available. Finally, the programme includes one compulsory non-credit bearing (study only) module in the first and second: SPA3000 Basic Mathematical Techniques and SPA5000 Communication Skills for Physicists.

The fourth year of the programme requires students to undertake a professional experience year which needs to be competitively applied for during their second year of study.

In addition to the modules listed below, which are delivered by QMUL, there are modules offered at level 7 by our University of London partner institutes that students may elect to take. Those modules are dependent on our University of London partners and may change from year to year. They are detailed on the programme website.

Academic Year of Study FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Professional Skills for Scientists	SPA4601	15	4	Compulsory	1	Semester 1
Mathematical Techniques 1	SPA4121	15	4	Compulsory	1	Semester 1
Classical Physics	SPA4401	15	4	Compulsory	1	Semester 1
Scientific Measurement	SPA4103	15	4	Compulsory	1	Semester 1
Modern Physics	SPA4402	15	4	Compulsory	1	Semester 2
Electric and Magnetic Fields	SPA4210	15	4	Compulsory	1	Semester 2
Mathematical Techniques 2	SPA4122	15	4	Compulsory	1	Semester 2
Our Universe	SPA4101	15	4	Elective	1	Semester 2

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Introduction to Energy and Environmental Physics	SPA4250	15	4	Elective	1	Semester 2
Basic Mathematical Techniques	SPA3000	0	4	Compulsory	1	Semester 2

Academic Year of Study FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Thermodynamics	SPA5219	15	5	Compulsory	2	Semester 1
Quantum Mechanics A	SPA5319	15	5	Compulsory	2	Semester 1
Nuclear Physics and Astrophysics	SPA5302	15	5	Elective	2	Semester 1
Physics Laboratory	SPA5201	15	5	Compulsory	2	Semester 2
Condensed Matter A	SPA5228	15	5	Compulsory	2	Semester 2
Electromagnetic Waves and Optics	SPA5222	15	5	Compulsory	2	Semester 2
Mathematical Techniques 3	SPA5218	15	5	Elective	2	Semester 1
Planetary Systems	SPA5241	15	5	Elective	2	Semester 2
Stars	SPA5307	15	5	Elective	2	Semester 1
Physical Dynamics	SPA5304	15	5	Elective	2	Semester 2
Communication Skills for Scientists	SPA5000	0	5	Compulsory	2	Semester 1
Introduction to Scientific Computing	SPA5666	15	5	Elective	2	Semester 1
Introduction to Scientific Computing	SPA5666	15	5	Elective	2	Semester 2

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Academic Year of Study FT - Year 3

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Statistical Physics	SPA6403	15	6	Compulsory	3	Semester 2
Physics Review Project	SPA6913	15	6	Compulsory	3	Semester 1 or 2
The Physics of Galaxies	SPA6305	15	6	Elective	3	Semester 2
Spacetime and Gravity	SPA6308	15	6	Elective	3	Semester 1
Fluid Dynamics	SPA6310	15	6	Elective	3	Semester 1
Statistical Data Analysis	SPA6328	15	6	Elective	3	Semester 1
Radiation Detectors	SPA6309	15	6	Elective	3	Semester 2
Mathematical Techniques 4	SPA6324	15	6	Elective	3	Semester 1
Quantum Mechanics B	SPA6413	15	6	Elective	3	Semester 1
Elementary Particle Physics	SPA6306	15	6	Elective	3	Semester 1
Physical Cosmology	SPA6311	15	6	Elective	3	Semester 1
Group Project for Physicists	SPA6543	15	6	Elective	3	Semester 2
Condensed Matter B	SPA6312	15	6	Elective	3	Semester 2
Quantum Mechanics and Symmetry	SPA6325	15	6	Elective	3	Semester 2
Computational Condensed Matter Physics	SPA6315	15	6	Elective	3	Semester 2

Academic Year of Study FT - Year 4

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Physics Professional Experience Year	SPA6XXX	120	6	Core	4	Semesters 1 & 2

Academic Year of Study FT - Year 5

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Advanced Quantum Field Theory	SPA7001U	15	7	Elective	5	Semester 2
Astrophysical Plasmas	SPA7004U	15	7	Elective	5	Semester 2
Cosmology	SPA7005U	15	7	Elective	5	Semester 1
Electromagnetic Radiation in Astrophysics	SPA7006U	15	7	Elective	5	Semester 2
Electronic Structure Methods	SPA7008U	15	7	Elective	5	Semester 2
Extrasolar Planets and Astrophysical Discs	SPA7009U	15	7	Elective	5	Semester 2
The Galaxy	SPA7010U	15	7	Elective	5	Semester 2
Phase Transitions	SPA7013U	15	7	Elective	5	Semester 1
Physics Research Project	SPA7016U	45	7	Core	5	Semesters 1 & 2
Physics Investigative Project	SPA7015U	30	7	Core	5	Semesters 1 & 2
Relativistic Waves and Quantum Fields	SPA7018U	15	7	Elective	5	Semester 1
Relativity and Gravitation	SPA7019U	15	7	Elective	5	Semester 1
Solar System	SPA7022U	15	7	Elective	5	Semester 1
Stellar Structure and Evolution	SPA7023U	15	7	Elective	5	Semester 1

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Functional Methods in Quantum Field Theory	SPA7024U	15	7	Elective	5	Semester 1
Research Methods for Astrophysics	SPA7020P	15	7	Elective	5	Semester 1
Differential Geometry in Theoretical Physics	SPA7027U	15	7	Elective	5	Semester 1
Advanced Cosmology	SPA7028U	15	7	Elective	5	Semester 2
Collider Physics	SPA7029U	15	7	Elective	5	Semester 2
Supersymmetric Methods in Theoretical Physics	SPA7031U	15	7	Elective	5	Semester 2

What are the entry requirements?

As per standard MSci Physics programme:
Grades AAB at A-Level. This must include grade A or above in both A-Level Mathematics and Physics. Excludes General Studies.
International Baccalaureate Diploma with a minimum of 34 points overall, including 6,6,5 from three Higher Level subjects. This must include a minimum of 6 in both Higher Level Mathematics, and Higher Level Physics.
European Baccalaureate: 80 % overall and 8 in both maths and physics.

How will the quality of the programme be managed and enhanced?

Each school/institute operates a Learning and Teaching Committee, or equivalent, which advises the School/Institute Director of Education on all matters relating to the delivery of taught programmes at school level including monitoring the application of relevant QM policies and reviewing all proposals for module and programme approval and amendment before submission to Taught Programmes Board. Student views are incorporated in the committee's work in a number of ways, such as through student membership, or consideration of student surveys.

How do we listen to and act on your feedback?

The Staff-Student Liaison Committee provides a formal means of communication and discussion between schools/institutes and its students. The committee consists of student representatives from each year in the school/institute together with appropriate representation from staff within the school/institute. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. Staff-Student Liaison Committees meet regularly throughout the year.

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What academic support is available?

The School of Physics and Astronomy provides each student with an academic advisor, normally the same member of staff for the duration of a student's studies, who can provide academic and pastoral guidance. Additionally the School has a dedicated Student Support Administrator who is available to discuss any student related problem. The School runs an open door policy which encourages the students to come and talk to their advisor, other academics or the dedicated Student Support Administrator. The School also actively participates in the QMUL Peer Assisted Study Scheme (PASS).
The Senior Tutor has overall responsibility for academic support and pastoral care within the School. The Senior Tutor also has a key role in overseeing the School's attendance policy. The Senior Tutor will address any problems that cannot be resolved by a student's academic adviser or the Student Support Officer. There will be additional support from the careers office and SPA professional service support team related to applying for professional experience opportunities.

Programme-specific rules and facts

Students must achieve an average mark of 60% in the first and second year of study to progress. Progression from year 4 to year 5 requires that the professional experience year module is passed. Students failing either of the progression hurdles will be transfered to the equivalent non-professional-experience MSci Physics programme, entering into the corresponding year of that programme with the appropriate progression hurdles from that programme to be applied.

The final degree classification is determined by the college mark which is a weighted average of the first, second, third, and fifth year averages in the ratio 1:3:6:6 respectively. The professional experience year does not contribute to the final college mark nor the final degree classification.

The Physics Professional Experience Year module is core and there is no opportunity for this module to be re-taken given the nature of that year. Synoptic reassessment of that module is permitted.

Specific support for disabled students

Queen Mary has a central Disability and Dyslexia Service (DDS) that offers support for all students with disabilities, specific learning difficulties and mental health issues. The DDS supports all Queen Mary students: full-time, part-time, undergraduate, postgraduate, UK and international at all campuses and all sites.

Students can access advice, guidance and support in the following areas:
• Finding out if you have a specific learning difficulty like dyslexia
• Applying for funding through the Disabled Students' Allowance (DSA)
• Arranging DSA assessments of need
• Special arrangements in examinations
• Accessing loaned equipment (e.g. digital recorders)
• Specialist one-to-one "study skills" tuition
• Ensuring access to course materials in alternative formats (e.g. Braille)
• Providing educational support workers (e.g. note-takers, readers, library assistants)
• Mentoring support for students with mental health issues and conditions on the autistic spectrum.

Links with employers, placement opportunities and transferable skills

Students will be expected to apply for a professional experience year to take place in year 4 of study. They will be coached in year 1 and/or 2 on CV practice and introduced to the careers service, as well as being briefed on current employers that are known to consider professional experience year applications in order to allow the students to focus on building an appropriate portfolio of expertise in order to apply for a position in year 3. This will include the fact that many employers require an appropriate academic performance for professional experience year students who they employ. This is typically a minimum of the equivalent of a 2.1 performance in study done thus far, however it will vary from employer to employer. In year 3 we will support the students on application for professional experience positions. Those students who are successful in finding a position will then undertake a 6-15month posting during year 4. Year 5 will see the students return to QMUL to complete their

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MSci studies. Students failing to win a professional experience position and passing the progression threshold may be offered the option of an unpaid research or outreach internship within the SPA, of length less than 12 months, otherwise they will be transferred onto the standard BSc Physics programme. Unpaid internships in the SPA are subject to availability and academic or other requirements (for example DBS check or H&S aptitude). Students failing to win a professional experience position and failing to pass the progression threshold will be transferred onto the standard MSci Physics programme.

Programme Specification Approval

Person completing Programme Specification:	
Person responsible for management of programme:	
Date Programme Specification produced / amended by School / Institute Learning and Teaching Committee:	
Date Programme Specification approved by Taught Programmes Board:	

Queen Mary University of London