Programme Specification (PG)

Awarding body / institution:	Queen Mary University of London
Teaching institution:	Queen Mary University of London
Name of final award and programme title:	MSc Physics: Particle Physics
Name of interim award(s):	PGCert/PGDip
Duration of study / period of registration:	1 calendar year FT
Queen Mary programme code(s):	PMSF-QMPHYS - PSPPH
QAA Benchmark Group:	
FHEQ Level of Award:	Level 7
Programme accredited by:	
Date Programme Specification approved:	
Responsible School / Institute:	School of Physical and Chemical Sciences

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

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

University College London, Kings College London and Royal Holloway, University of London
Disclaimer: The availability of modules offered by KCL, UCL and RHUL are outside of QMUL's control and we cannot guarantee that all modules will be running each year.

Programme outline

The MSc Particle Physics at Queen Mary runs full-time for one calendar year and provides a thorough training at an advanced level in the area chosen by the student. The programme is flexible and students can work at the interface between different pathways to as to build a broad background in physics. The programme also allows students to take modules offered as part of the intercollegiate Physics programme by the other colleges of the University of London provided an unparalleled choice of topics and expertise.

Aims of the programme

The purpose of this programme is manyfold: To allow students holding a (generic, e.g. BSc Physics) first degree to specialise in a particular area of Physics (particle physics in the case of this stream). To train graduates in research skills suitable for both further (post-graduate research) studies and employment (e.g. industrial research). To enable students who did not gain a sufficiently

high first degree classification (e.g. a second class degree) to continue with postgraduate studies.

What will you be expected to achieve?

Students successfully completing the programme will have a deep knowledge of advanced topics in physics, including a solid understanding of Quantum Field Theory and its use for describing and interpreting particle physics experiments. The programme includes a one-term long project, supervised by one of the researchers in our School, that students can choose among a wide range of topics of current interest in particle physics. This MSc programme will prepare a student for a PhD in particle physics, but also more generally, for research and employment in fields that require excellent analytic skills and the ability to model complex systems.

Academic Content:	
A 1	Know the fundamental laws and physical principles, along with their applications, in a specific area of physics.
A 2	Manage their own research, making use of journal articles and other primary sources.
A 3	Communicate complex scientific ideas, concisely, accurately and informatively.
A 4	Use mathematical analysis to model physical behaviour and interpret the mathematical descriptions of physical phenomena.

Disciplinary Skills - able to:	
B 1	To solve advanced problems in physics using appropriate mathematical tools (to order of magnitude or more precisely as appropriate).
B 2	To plan and execute an investigation and to critically analyse the results, drawing valid conclusions.
B 3	To prepare a detailed technical report on their project and compare their results with published data ,expected outcomes or theoretical predictions.
B 4	To identify relevant physical principles and translate problems into mathematical statements.

Attributes:	
C 1	Acquire and apply knowledge in a rigorous way
C 2	Explain and argue clearly and concisely
C 3	Connect ideas and information within their field of study

C4	Critically evaluate the reliability of different sources of information
C5	Acquire substantial bodies of new knowledge

How will you learn?

The majority of taught modules consist of three hour lecture blocks, with some modules incorporating substantial computer laboratory sessions. The project is undertaken within the "Particle Physics Research Centre" group at QMUL and uses computational, theoretical or laboratory methods as appropriate and may well involve additional, technical training. In all cases the project involves weekly one to one meetings with the supervisor.

How will you be assessed?

The majority of taught modules are assessed by a final examination (typically 90% of the final mark) and by coursework (typically 10% of the final mark), although individual module mark schemes may vary from this. The compulsory MSc Physics project is assessed by the final written report (90% of the final mark) and student performance during the project (10% of the final mark).

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 120 credits of taught modules (chosen from the list of approved modules) taken during semesters 1 and 2, and a compulsory 60 credit MSc Physics Research Project (SPA7012P) undertaken during semesters 2 and 3. The MSc project will be based on a Particle Physics topic. In addition to the Particle Physics project, there are compulsory taught modules:

Semester A
SPA7018P Relativistic Waves & Quantum Fields

Semester B
SPA7001P Advanced Quantum Field Theory

Students can pick from any of the level 7, 15 credit elective modules to the total of 90 credits:

SPA7033P Practical Machine Learning
SPA7034P Astrophysical Computing
SPA7008P Electronic Structure Methods
SPA7024P Functional Methods in Quantum Field Theory
SPA7031P Differential Geometry in Theoretical Physics
SPA7029P Collider Physics

SPA7023P Stellar Structure and Evolution
SPA7019P Relativity and Gravitation
SPA7036P Radiative Transfer and Astrochemistry (New 2022/23)
SPA7022P Solar System
SPA7010P The Galaxy
SPA7004P Astrophysical Plasmas
SPA7009P Extrasolar Planets & Astrophysical Discs
SPA7028P Advanced Cosmology
SPA7031P Supersymmetric Methods in Theoretical Physics
SPA7032P Introduction to Strings and Branes

INK7022P Mathematical Methods for Theoretical Physics
INR7007P Statistical Mechanics
INU7001P Advanced Quantum Theory
INK7091P Photonics and Metamaterials
INU7022P Quantum Computation and Communication
INU7017P Particle Physics
INR7003P Particle Accelerator Physics
INK7066P Modelling Quantum Many-Body Systems
INU7016P Order and Excitations in Condensed Matter
INK7037P Theoretical Treatments of Nano-systems
INR7012P Physics at the Nanoscale
INR7008P Superfluids, Condensates and Superconductors
INK7067P Advanced Condensed Matter
INK7032P Standard Model Physics and Beyond
INR7014P Statisical Data Analysis
INU7045P Planetary Atmospheres
INU7008P Solar Physics
INU7026P Space Plasma and Magnetospheric Physics
INK7068P Cellular Biophysics
INK7069P Dark Matter and Dark Energy
INU7103P High Energy Astrophysics
Plus any new level 7 modules belonging to SPA and the intercollegiate programme.

Students can pick up to two Level 6 modules from the following:
SPA6308P Spacetime and Gravity
SPA6413P Quantum Mechanics B

Academic Year of Study

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester

What are the entry requirements?

The entry requirements would require students to have at least an upper second class degree in Physics or closely related discipline; in exceptional circumstances students may be admitted with a lower second class degree. Students would have to achieve at least 6.5 IELTS score and the equivalent in the relevant TOEFL assessment. This is in line with the current Science and Engineering requirements.

How will the quality of the programme be managed and enhanced? 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 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.
Each school operates a Learning and Teaching Committee, or equivalent, which advises the School/Institute Director of Taught Programmes 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 this Committee's work in a number of ways, such as through student membership, or consideration of student surveys.
All schools operate an Annual Programme Review of their taught undergraduate and postgraduate provision. The process is normally organised at a School-level basis with the Head of School, or equivalent, responsible for the completion of the school's Annual Programme Reviews. Schools/institutes are required to produce a separate Annual Programme Review for undergraduate programmes and for postgraduate taught programmes using the relevant Undergraduate or Postgraduate Annual Programme Review pro-forma. Students' views are considered in this process through analysis of the NSS and module evaluations.

What academic support is available?

The students will be allocated an academic advisor as well as a project supervisor. Weekly project supervision meetings are expected. Additionally the School has a dedicated Student Support Officer 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 Officer.

Programme-specific rules and facts

MSc Particle Physics students must pass six out of eight taught modules and two failures can be condoned down to 40%, as long as the average achieved across all modules is 50% or greater.

How inclusive is the programme for all students, including those with disabilities?

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

The School has a dedicated SEPnet Employer Engagement Officer who provides links between students and industry, arranging work placement opportunities.

Programme Specification Approval

Person completing Programme Specification:	Leonie Dos Santos
Person responsible for management of programme:	Rodolfo Russo
Date Programme Specification produced / amended by School / Institute Learning and Teaching Committee:	16 Jun 2022
Date Programme Specification approved by Taught Programmes Board:	