

PROGRAMME SPECIFICATION

This document describes the **MSc in Physics (Euro Masters)** programme offered in the Physics Department. This specification is valid for new entrants from **September 2015**.

This is a two-year programme designed to conform to the highest European (and international) standards. Similar programmes are available at other physics departments of the South-East Physics Network (SEPNet), a consortium of the departments from RHUL, QMUL and the Universities of Southampton, Surrey, Sussex and Kent. A key feature of the programme is the possibility of combining studies at more than one partner department; thus a student could spend one year at one department and the second at another.

The aims of the programme are:

- to equip students for future careers, in the UK and internationally, including research in universities, industry and other organisations;
- provide a technical background for a broader range of careers in the industrial scientific instrument sector and elsewhere;
- develop an advanced knowledge of a chosen area of contemporary physics via lecture courses;
- obtain training in research techniques through lecture courses, directed study, and an individual project;
- develop key skills relevant for a postgraduate science student.

Upon successful completion of the programme students will be well-prepared for doctoral research in the best universities around the world.

The Department has close links with Rutherford Appleton Laboratory and the Harwell Science and Innovation Campus (including ISIS neutron spallation source and DIAMOND synchrotron x-ray scattering facility), Oxford Instruments plc (a major employer in the field), the National Physical Laboratory, CERN and other institutions. An important element of this programme, which ensures its wider relevance, involves external involvement in the programme. This entails:

- input on the course content;
- collaborative projects (some projects may involve time spent at these collaborators)
- visits to industrial facilities and laboratories;
- guest lectures.

Further Information

[Learning outcomes](#)

[Teaching, learning and assessment](#)

[Details of the programme structure\(s\)](#)

[Progression and award requirements](#)

[Student support and guidance](#)

[Admission requirements](#)

[Further learning and career opportunities](#)

[Indicators of quality and standards](#)

[List of programmes, with details of awards, degree titles, accreditation and teaching arrangements](#)

This document provides a summary of the main features of the programme(s), and of the outcomes which a student might reasonably be expected to achieve if full advantage is taken of the learning opportunities provided. Further information is contained in the College prospectus, the College Regulations and in various handbooks issued to students upon arrival. Whilst Royal Holloway keeps all its information for prospective applicants and students under review, programmes and the availability of individual courses are necessarily

subject to change at any time, and prospective applicants are therefore advised to seek confirmation of any factors which might affect their decision to follow a specific programme. In turn, Royal Holloway will inform applicants and students as soon as is practicable of any substantial changes which might affect their studies.

Learning outcomes

Teaching and learning in the programme are closely informed by the active research of staff. In general terms, the programme provides opportunities for students to develop and demonstrate the following learning outcomes:

Knowledge and understanding:

- a systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of the discipline;
- a comprehensive understanding of techniques applicable to their own research or advanced scholarship;
- originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline.

Skills and other attributes

- problem-solving skills – applied in new or unfamiliar environments;*
- learning skills – including self-directed and autonomous study;*
- investigative skills;*
- information retrieval skills;*
- communication skills – to both specialists and non-specialists;*
- analytical skills;*
- IT skills;*
- personal skills such as teamwork and independence.*
- In addition, as a result of carrying out the research project students should develop research skills using a mix of experimental, theoretical and computational techniques appropriate to the field together with related transferable skills. The project will provide students with an opportunity for originality in developing and applying their ideas. Students should develop their communication skills and apply them to the writing of the project report and the presentation of an oral report on the project.

* transferable skills

[Back to top](#)

Teaching, learning and assessment

A variety of teaching methods will be used, including lectures, directed study, seminars and one-on-one sessions. The Programme makes use of the Department's dedicated Audio-Visual suite so that courses may be shared with other institutions of the South-East Physics Network (SEPnet) and/or other colleges of the University of London. Assessment is based on the Project thesis, course examinations and coursework. Full details of the assessments for individual courses can be obtained from the [Department](#).

[Back to top](#)

Details of the programme structure(s)

Please note that not all optional courses run each year. A full list of optional courses for the current academic year can be obtained from the [Department](#).

Students must take the following mandatory second year course:

PH5100: Project (15 ECTS) non-condonable;

and choose six optional courses in their first year (7.5 ECTS) from the list below:

(i) PH5201: Math Methods for Theoretical Physics

- (ii) PH5205: Lie Groups and Lie Algebras
- (iii) PH5210: Quantum Theory
- (iv) PH5211: Statistical Mechanics
- (v) PH5226: Advanced Quantum Theory
- (vi) PH5242: Relativistic Waves & Quantum Fields
- (vii) PH5245: Advanced Quantum Field Theory
- (viii) PH5261: Electromagnetic Theory
- (ix) PH5317: Galaxy and Cluster Dynamics
- (x) PH5421: Atom and Photon Physics
- (xi) PH5427: Quantum Computation and Communication
- (xii) PH5431: Molecular Physics
- (xiii) PH5442: Particle Physics
- (xiv) PH5450: Particle Accelerator Physics
- (xv) PH5472: Order and Excitations in Condensed Matter
- (xvi) PH5473: Theoretical Treatments of Nano-Systems
- (xvii) PH5475: Physics at nanoscale
- (xviii) PH5478: Superfluids, Condensates & Superconductors
- (xix) PH5501: Standard Model Physics and Beyond
- (xx) PH5512: Nuclear Magnetic Resonance
- (xxi) PH5515: Standard Data Analysis
- (xxii) PH5534: String Theory and Branes
- (xxiii) PH5541: Supersymmetry
- (xxiv) PH5600: Stellar Structure and Evolution
- (xxv) PH5601: Advanced Cosmology
- (xxvi) PH5602: Relativity and Gravitation
- (xxvii) PH5603: Astrophysical Fluid Dynamics
- (xxviii) PH5630: Planetary Atmospheres
- (xxix) PH5640: Solar Physics
- (xxx) PH5650: Solar System
- (xxxii) PH5660: The Galaxy
- (xxxiii) PH5680: Space Plasma and Magnetospheric Physics
- (xxxiv) PH5690: Extrasolar Planets and Astrophysical Discs
- (xxxv) PH5670: Astrophysical Plasmas
- (xxxvi) PH5800: Molecular Biophysics
- (xxxvii) PH5810: Theory of Complex Networks
- (xxxviii) PH5820: Equilibrium Analysis of Complex Systems
- (xxxix) PH5830: Dynamical Analysis of Complex Systems
- (xl) PH5840: Mathematical Biology
- (xli) PH5850: Elements of Statistical Learning

[Back to top](#)

Progression and award requirements

Students leaving or transferring to another SEPnet partner after completion of the first year will be awarded a Postgraduate Diploma in Physics (PGDip Physics) from RHUL.

To pass the PGDip programme a student must achieve an overall weighted average of at least 50.00%, with no mark in any element which counts towards the final assessment falling below 50%. Failure marks between 40-49% are not usually condoned for the award of a Postgraduate Diploma, but if they are, such condoned fails would be in courses which do not constitute more than 25% of the final assessment, provided that the overall weighted average is at least 50.00%, but a failure mark (i.e. below 50%) in the Project cannot be condoned.

The PGDip degree with Merit may be awarded if a student achieves an overall weighted average of 60.00% or above, with no mark in any element which counts towards the final assessment falling below 50%.

The PGDip degree with Distinction may be awarded if a student achieves an overall weighted average of 70.00% or above, with no mark in any element which counts towards the final assessment falling below 50%. A Distinction will not normally be awarded if a student re-sits or re-takes any element of the programme. In exceptional circumstances a viva may be held for a student at the request of the Examiners.

In order to progress from the first to the second year of this MSc programme a student must achieve the standard of a PGDip in their first year. Students must pass the Project. Students must pass at least four of the taught courses, with an average of at least 50.00% over the six courses taken. Progressing students have the option to re-sit or re-take failed courses.

To pass the MSc programme a student must achieve an overall weighted average of at least 50.00%, with no mark in any element which counts towards the final assessment falling below 50%. Failure marks between 40-49% can be condoned in courses which do not constitute more than 25% of the final assessment, provided that the overall weighted average is at least 50.00%, but a failure mark (i.e. below 50%) in the Research Project cannot be condoned.

The Masters degree with Merit may be awarded if a student achieves an overall weighted average of 60.00% or above, with no mark in any element which counts towards the final assessment falling below 50%. The Merit will not normally be awarded if a student re-sits or re-takes any element of the programme.

The Masters degree with Distinction may be awarded if a student achieves an overall weighted average of 70.00% or above, with no mark in any element which counts towards the final assessment falling below 50%. A Distinction will not normally be awarded if a student re-sits or re-takes any element of the programme. There is an oral examination, normally in the last week of the programme, at which the Visiting Examiner and at least one other examiner is present.

Students from other SEPNet partners and elsewhere joining the second year of the programme, having satisfied the admission requirements (to the second year) specified below, will be assessed on their second-year performance only.

[Back to top](#)

Student support and guidance

- The Director of Graduate Studies holds an induction meeting for all new postgraduate students in the first week of the programme.
- The Programme Director provides primary support for each student, including overall personal and academic welfare.
- The Project Supervisor provides additional academic support. Teachers of the lecture courses monitor progress on the courses. Supervisors and teachers provide progress reports on each student at each meeting of the Postgraduate Committee.
- Representation on the Student-Staff Committee.
- Detailed PG handbook and course booklets.
- Extensive supporting materials and learning resources in College and University libraries, as well as the Computer Centre.
- College Careers Service and Departmental Employability Lead Officer.
- Access to all College and University support services, including Student Counselling Service, Health Centre, Students' Union and students with additional learning needs also have access to Disability and Dyslexia Services (ESO).
- Postgraduate seminars and meetings, research colloquia, Physics Society meetings and parties.

[Back to top](#)

Admission requirements

For details of admissions requirements please refer to the [Course Finder](#).

[Back to top](#)

Further learning and career opportunities

This programme provides an ideal grounding for students to pursue PhD programmes in universities, and to equip them for future research careers in universities, industry and other organisations in Europe and around the world. The programmes will also provide a technical background for a broader range of careers in the industrial scientific instrument sector and elsewhere around the world. For more details on further learning and career opportunities please refer to the [Careers Service](#).

[Back to top](#)

Indicators of quality and standards

Royal Holloway's position as one of the UK's leading research-intensive institutions was confirmed by the results of the most recent Research Excellence Framework (REF 2014) conducted by the Higher Education Funding Council (HEFCE). The scoring system for the REF 2014 measures research quality in four categories, with the top score of 4* indicating quality that is world-leading and of the highest standards in terms of originality, significance and rigour and 3* indicating research that is internationally excellent. 81% of the College's research profile was deemed to be within the 4* or 3* categories, an increase of over 20% since 2008. This results for the quality of our research outputs placed Royal Holloway 15th in the UK based on an overall Grade Point Average (GPA) score and 20th in the UK for 4* and 3* research. The Department of Physics is ranked 35 in the UK for research of 4* standard and 34 for 3* and 4* research.

[Back to top](#)

List of programmes

The programmes are taught by staff at Royal Holloway, in conjunction with staff from other colleges of the University of London for some of the taught courses. The Masters leads to an award of the University of London. The Postgraduate Diploma leads to an award of Royal Holloway and Bedford New College. Postgraduate programmes in Physics are not subject to accreditation by a professional body. The Banner programme codes are given in parentheses.

- MSc in Physics (Euro Masters) (2441)
- PG Diploma Physics (xxxx)

[Back to top](#)