F323 (THEORETICAL PHYSICS) PROGRAMME SPECIFICATION

1. Awarding body/institution: Queen Mary, University of London

2. Teaching institution:
   - Queen Mary, University of London
   - University College London
   - King’s College London
   - Royal Holloway, University of London

3. Programme accredited by: Institute of Physics (2005); next visit 2010/11

4. Final Award: MSci

5. Programme title: Theoretical Physics

6. UCAS code: F323

7. QAA Benchmark Group: Physics, astronomy and astrophysics

8. Criteria for admission:
   Normally three A-levels with a minimum of 320 points. This must include 220 points in Physics and Mathematics with a minimum of grade B.

9. Aims of the programme:

   For all programmes which we offer 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 programmes that enable students with a variety of educational backgrounds to pursue programmes in physics as a single subject as well as in physics combined with other natural and applied sciences;
   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. instil in 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 programmes that prepare students, where appropriate, for a range of professional careers in physics and associated interdisciplinary fields.
   viii. provide opportunities for students to appreciate the beauty of physics and to develop a desire for learning.

10. Learning outcomes for the programme:
As with our aims all MSci programmes share a set of common learning outcomes. A student graduating with an MSci should:

i. have acquired a knowledge of essential physics, possibly coupled with experience of another pure or applied science;

ii. be able to communicate this knowledge;

iii. have acquired essential skills in the use of computers for mathematics, word-processing, spreadsheet computing and the acquisition and manipulation of data, in measurement and the analysis of uncertainties of observation, in the use of high-level computer languages, in the art of scientific report-writing and in the oral presentation of technical material;

iv. be able to apply scientific methods to the analysis of problems;

v. have seen and understood the application of essential physics to one or two specialised areas of study;

vi. have acquired an understanding of the workings of the physical world;

vii. be able to appreciate the rôle of science in general, and of physics in particular, within a broader range of human cultural activity.

viii. be fluent in the language and methods of physics;

ix. be able to apply essential physics to the understanding of phenomena in specialised areas of study;

x. be able to plan and execute a small research project;

xi. be able to apply acquired knowledge and skills to the modelling of new problems in physics;

xii. be equipped for a professional career based on physics.

An MSci graduate should be able to enter further training at PhD level and to become a professional physicist. S(he) should in addition be able to enter any of a number of other careers which use the transferable skills gained in the four year programme of study.

11. Teaching, learning and assessment strategies:

Our programmes are constructed within a modular structure in which each student takes eight modules per year. Our overall strategy is to achieve a balance, appropriate to the aims of each module, 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).

Compulsory tutorials, exercise classes or laboratories, are provided for certain modules: tutorials are used to reinforce students’ knowledge and understanding in conceptually challenging modules, such as those on quantum and statistical physics, whilst exercise classes are used to develop the specific skills needed in modules such as *Electric and Magnetic Fields*. 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, review and experimental projects are used to develop students’ investigative skills.

Assessment is by a mixture of continuous assessment and formal written examinations at the end of each year. We use a variety of in-module 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-module assessments are combined with formal final written examination results and oral examinations (on project reports) to produce the final mark for each module. The precise mixture of in-module and final exam marks to give the overall mark varies between different modules and is specified in the detailed module description given in the Student Handbook (see below).

12. Programme structure and requirements, levels and module:

Each programme we offer is made up of a mixture of compulsory modules (C) common to most programmes and suggested (S) module which offer a range of choice to the student depending upon his/her interests and aptitudes. The compulsory modules for this programme are PHY103, PHY108, PHY116, PHY121, PHY122, PHY210, PHY215, PHY217, PHY218, PHY302, PHY222, PHY304, PHY319, PHY213, PHY300, PHY413, PHY913, PHY325, PHY403, PHY653, PHY400, I17226, PHY966, I47211, and PHY415. Our London MSci Degree programme is unique in having an intercollegiate fourth year of study. The modules available in the fourth year are planned and delivered jointly by the Physics Departments at Queen Mary, University College, King's College and Royal Holloway. Thus the fourth year has a rich choice of modules that cover not only physics, but theoretical physics, astrophysics and applied physics. There is a fourth year project which lasts throughout the academic year and counts for a quarter of the final year marks. The first three years are taught entirely at the Queen Mary campus while in the fourth year students will do their project at Queen Mary but may attend lectures in central London as well as at Queen Mary. We have a detailed four-year plan for each MSci programme and for F323 it may be seen at the web address

http://www.ph.qmul.ac.uk/~intranet/progs.php?id=F323

In addition for each module in the first three years there is a detailed description including the syllabus, the recommended textbook and the forms of assessment. This may be accessed via the undergraduate student handbook at

http://www.ph.qmul.ac.uk/~intranet/msciindex.php

Fourth year modules may be chosen from a wide range of modules taught across the four participating colleges. Descriptions of these final year modules may be found at

http://www.ph.qmul.ac.uk/~intranet/msciindex.php

Some of the suggested options are taught in the Queen Mary School of Mathematical Sciences whose website is at

http://www.maths.qmul.ac.uk

13. Quality assurance and enhancement:

Each student enters the Department via the College Induction Process plus a Physics Department Induction. Each student is assigned to a personal tutor who acts throughout the student’s Degree studies to help with choice of modules and with any problems that may affect a student’s studies. Teaching and Learning policy is decided by a Departmental Teaching Committee on which sit all the programme organisers. To assess how well our policy is implemented we have a variety of feedback mechanisms. There is a Student Staff Liaison Committee (SSLC) which meets once per term to consider student concerns and to monitor the results of student questionnaires circulated in each module. The Staff Convenor of the SSLC sits on the Teaching Committee and reports back student views and suggestions. Each module organiser submits a report on his/her module after the final examination which is considered by the Teaching Committee. Programmes of study are subject to review on an annual basis.
14. Transferable skills and employment possibilities:

Almost all MSci graduates go on to further specialist study of Physics at PhD level but they may easily enter a range of other career paths that use the transferable skills gained in the MSci programme of study. These employment areas include teaching at secondary or tertiary level, management, finance, IT and journalism. All physics graduates with reasonable Degrees are highly employable because of the skills they gain in their studies. The most important of these skills are numeracy, familiarity with computers and IT, problem-solving skills, ability to carry out measurement and observation and to analyse the results thereof, the ability to write technical reports and the ability to give oral presentations of scientific arguments.

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<td>Person responsible for management of programme</td>
<td>Dr A Brandhuber</td>
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