Programme Specification for the Physics and Music Performance BSc Programme

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 he/she takes full advantage of the learning opportunities that are provided. This specification provides a source of information for students and prospective students seeking an understanding of the nature of the programme and may be used by the College for review purposes and sent to external examiners. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the course handbook or on-line at https://workspace.imperial.ac.uk/physics/Internal/students/ug/info/Freshers%20Handbook/Freshers%20Handbook%202012.pdf and http://www.rcm.ac.uk/?pg=901 The accuracy of the information contained in this document is reviewed by the College and may be checked by the Quality Assurance Agency.

1. Awarding Institution: Imperial College London
2. Teaching Institution: Imperial College London and Royal College of Music
3. External Accreditation by Professional / Statutory Body: Institute of Physics
4. Name of Final Award (BEng / BSc / MEng etc): BSc
5. Programme Title (e.g. Biochemistry with Management): Physics and Music Performance
6. Name of Department / Division: Physics
7. Name of Faculty: Natural Sciences
8. UCAS Code (or other coding system if relevant): F3W3

9. Relevant QAA Subject Benchmarking Group(s) and/or other external/internal reference points

Physics, Astronomy and Astrophysics (2008)
http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/Physics08.pdf

Music (2008)
http://www.qaa.ac.uk/academicinfrastructure/benchmark/statements/Music08.pdf

“The Physics Degree”, Institute of Physics (2009)

10. Level(s) of programme within the Framework for Higher Education Qualifications (FHEQ):

<table>
<thead>
<tr>
<th>Programme Level</th>
<th>Levels</th>
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<tbody>
<tr>
<td>Bachelor's (BSc, BEng, MBBS, BMus)</td>
<td>Level 6</td>
</tr>
<tr>
<td>Integrated Master's (MSci, MEng)</td>
<td>Levels 6 and 7</td>
</tr>
<tr>
<td>Master's (MSc, MRes)</td>
<td>Level 7</td>
</tr>
</tbody>
</table>

1 BSc Physics with Studies in Music Performance (F3W3) Programme Specification 2012
11. Mode of Study       Full Time
12. Language of Study:       English
13. Date of production / revision of this programme specification: August 2011
14. Educational aims/objectives of the programme

The programme aims/objectives are to:

• provide high quality education in physics within an environment committed to excellence in both teaching and research;
• attract well-qualified students and provide intellectually challenging degree programmes containing an appropriate amount of flexibility so that students can develop their specialist interests, and so equip themselves to follow a wide variety of careers. These careers include scientific research; physics-related careers in industry, public service or the media; and other employment which values the analytical, mathematical and computational skills of a well-trained physics graduate;
• educate students in the core of physics, including substantial practical and experimental physics, while offering sufficient flexibility to allow students to follow particular interests within and beyond physics;
• Train students to a level in musical performance, through tuition by the Royal College of Music (RCM), to be able to pursue a professional career as a performing musician.

15. Programme Learning Outcomes

1. Knowledge and Understanding
Knowledge and Understanding of:

1. the fundamentals of physics, which all students need to cover, including electromagnetism, optics, quantum and classical mechanics, relativity, statistical physics and thermodynamics, wave phenomena and the properties of matter.
2. the application of the fundamental principles to particular areas. These include nuclear and particle physics, condensed matter physics and atomic structure.
3. a few subjects which students study in greater depth and appreciate current developments at the frontiers of the subject.
4. repertoire and stylistic studies in music
5. selected optional studies in music at a greater depth

Teaching/learning methods and strategies
Acquisition of 1 to 3 is through core courses in years 1 to 4 together with more advanced specialist options in year 4. Lectures are an integral part of modules, and are supported by a variety of other teaching and learning methods, including tutorials, seminars, problem classes, laboratory work and computer-based work. Throughout the four years, students engage in private study in which they work through set problem sheets and assimilate the content of lectures. They engage in project work in years 1 and 3. Acquisition of 4 and 5 is through courses provided by the RCM in all 4 years. Assessment of knowledge and understanding in physics is through a combination of unseen written examinations, assessed problem solutions, vivas, laboratory and project reports and presentations and, in music, through essays and analysis/composition.

2. Skills and other Attributes

Intellectual Skills
Students will learn how to:

1. formulate and tackle problems in physics, including the identification of appropriate physical principles and the use of special and limiting cases and order-of-magnitude estimates, to arrive at a solution which is presented with an explicit statement of assumptions and approximations.
2. use mathematics to describe the physical world, selecting appropriate equations, constructing models, interpreting mathematical results and critically comparing them with experiment and observation.
3. participate, under supervision, in an extended physics investigation.
4. research and collate musical information and ideas
5. make informed and mature musical judgments
6. present historically- and analytically-informed musical performances.

Teaching/learning methods and strategies
All lecture courses are accompanied by problem sheets, which students work through privately, and are supported by (i) small group tutorials in years 1 to 3, (ii) problem classes in years 1 & 2, (iii) seminars in groups of around 18 in year 1, (iv) access to lecturers in ‘Office hours’, (v) “Rapid Feedback” classes for Level 3 and 4 theoretical option courses. Assessment is primarily by unseen examination, notably the Comprehensive (synoptic) papers in year 3. Additionally, problem solutions are assessed as coursework in Years 1 and 2. Students acquire 3 in the context of the final year project. Students acquire 4, 5 and 6 through a range of courses and practical activities at the RCM, and the practical aspects of 5 and 6 are learnt in the context of preparing musical performances and practical studies on the principal instrument.

Practical Skills
Students will learn how to:

1. plan, execute and report the results of a complex extended experiment or investigation, using appropriate methods to analyse data and to evaluate the level of its uncertainty.
2. use appropriate software such as programming languages and packages in a physics investigation.
3. perform music with high levels of technical command and interpretative insight in a variety of contexts: as a soloist; in a small/large ensemble; at short notice; to an intensive schedule.

Teaching/learning methods and strategies
Laboratory classes take place in year 1 (and optionally year 4) with occasional supporting lectures. Experiments vary in duration from a few days to several weeks. Experiments are described by scripts. Students take computing classes in year 1 with further optional courses after that. Students are assessed by a mixture of written reports, keeping a lab book, interview, and interaction with demonstrators. Students further develop practical or theoretical skills in the project in year 3. Students acquire 3 through practical training at the RCM and private practice and are assessed through individual practical examinations.

Transferable Skills
Students will learn how to:

1. solve open-ended problems and problems with well-defined solutions by formulating problems in precise terms, identifying key issues and trying different approaches in order to make progress.
2. carry out an independent investigation using textbooks and other available literature, searching databases and interacting with colleagues and staff to extract important information.
3. communicate effectively by listening carefully and presenting complex information in a clear and concise manner orally, on paper and using ICT.

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4. use analytical skills, paying attention to detail and using technical language correctly, to manipulate precise and intricate ideas, and to construct logical arguments.
5. use ICT skills for communication and analysis.
6. work independently with self-motivation, determination and emotional resilience, use their initiative, organize themselves to meet deadlines, plan and execute a project.
7. work in groups, interacting constructively with others.
8. approach tasks with adaptability, enterprise, resourcefulness and realism
9. act entrepreneurially, identifying customer needs, using skills of self-promotion, networking and negotiation

Teaching/learning methods and strategies
Acquisition of 1 is partly through the methods and strategies outlined above, and specifically through tutorial and private study preparation for the two Comprehensive (synoptic) examination papers in year 3. Acquisition of 2, 3 & 4 comes through guided preparation of individual and group presentations and essays in years 1 & 2 and through a project in year 3.
Acquisition of 5 is through an ICT class in year 1, through the use of IT in experimental classes and projects, and through guided preparation of presentations and a CV.
Acquisition of 6 is initially through private study guided by tutors, project work guided by supervisors, laboratory classes guided by demonstrators, and seminar sessions on study skills at Imperial. The RCM provides 6 through training and preparation for performance and through coursework. In year 3 these skills are extended and integrated in a project.
Acquisition of 7 is through ensemble work in music, and, at Imperial, through group work in and directed through seminars, tutorial discussion, and working in pairs in laboratory.
Acquisition of 8 and 9 is through opportunities provided by the Woodhouse Centre for external musical engagements.
Assessment is by essay, individual and group presentation, laboratory and computing reports, project reports, and by interview.

16. The following reference points were used in creating this programme specification

- FHEQ (Level 6)
- EHEA
- Imperial Physics Undergraduate Course Handbook
- RCM BMus(Hons) Programme Handbook
- Subject Benchmark Statements
- PSRB documents (Institute of Physics)
17. Programme structure and features, curriculum units (modules), ECTS assignment and award requirements

Year One:

The total number of core lectures is about 180. Coursework, consisting of Assessed Problem Sheets in Terms 1 and 2, counts towards the assessment of all lecture courses at the level of 15%. In term 1 lectures are supported by about 30 problem classes with the whole class of about 240 and 7 tutorials in groups of 5 as well as 10 seminars in groups of 20. In term 2 support will be in the form of 30 classes in groups of 20. Students study their principal instrument throughout the year at the RCM (30 hours, 30 ECTS). All ECTS count equally. The whole of year 1 counts towards 9.86% of the final degree mark. Students also take the RCM Professional Skills course (5 ECTS) but this is credited in year 2.

Term one
At the start of the year students attend a Mathematics Mastery Test. This does not count in the final degree mark but students who fail this test must pass a resit later in the year after attending special problem classes. All students attend lecture courses in Mathematics (15 ECTS total in terms 1 and 2) and Mechanics, Vibrations and Waves (8 ECTS). Professional Skills I, taught through seminars in term 1, together with problem solving taught through classes of 20 in terms 2 & 3, counts 4 ECTS in total. Laboratory and computing in terms 1 and 2 (total of approximately 80 timetabled hours) count 9 ECTS. Students attend the RCM professional skills lecture series.

Term Two:
Students attend lecture courses in Electricity, Magnetism and Relativity (8 ECTS), and Quantum Physics and Structure of Matter (8 ECTS) Students also attend the RCM professional skills Alexander technique classes.

Term Three:
The first few weeks of the term are used to complete the lecture courses started in term 2. All examinations take place in term 3, including a problem solving test that contributes towards the Professional Skills element. After the examinations, all students complete a project (generally in pairs) which counts 4 ECTS.

Students must pass all elements to proceed directly to year 2. Students who fail any of the examinations are required to attend the September resits, following which those who pass their failed elements will be qualified to proceed, but those who fail any resits are required to withdraw and may have one more resit attempt the following summer.

Year Two:

The total number of core lectures is about 130. Core lectures are supported by about 39 problem classes and about 24 tutorials in groups of 4. Coursework, consisting of Assessed Problem Sheets in Terms 1 and 2, counts towards the assessment of all lecture courses at the level of 15%. Students study their principal instrument throughout the year at the RCM (30 hours, 30 ECTS). Students take a course in Historical Studies (10 ECTS). RCM Professional Skills (taken in year 1) is credited in year 2. All ECTS count equally. The whole of year 2 counts towards 19.45% of the final degree mark. Students also take the RCM Aural Training course (5 ECTS) but this is credited in year 3.

Term one:
All students attend lecture courses in Quantum Mechanics (8 ECTS) and Thermodynamics & Statistical Physics (8 ECTS). Statistics of Measurement and Mathematics together count 9 ECTS. Professional Skills II (A CV exercise and an assessed essay) counts 2 ECTS. Students also attend the RCM History lectures.

Term Two:
All students attend core lecture courses in Electrons in Solids and Applications of Quantum Mechanics (together 8 ECTS). The RCM History lectures continue during this term.

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Term Three:
The first few weeks of the term are used to complete the lecture courses started in term 2. All examinations take place in term 3.

Students must pass all elements to proceed directly to year 3. Students who fail any of the examinations are required to attend the September resits, following which those who pass their failed modules will be qualified to proceed, but those who fail any resits are required to withdraw and may have one more resit attempt the following summer.

Year Three:
All ECTS count equally except the comprehensive element (which has additional weight) and the project or essay. The whole of Year 3 counts 43.17% towards the final degree mark, of which the comprehensive element counts 10.92%.

Terms one and two:
Core Physics for Musicians III (total 27 ECTS): All students attend approximately 90 core lectures in Solid State and Atomic & Molecular Physics (Term 1, 6 ECTS), Electromagnetism and Optics (term 2, together 9 ECTS) and Nuclear & Particle Physics (Term 2, 6 ECTS). Students also take a one-term project (100 timetabled hours, 6 ECTS) or research and write an essay. Students may choose to do the project in year 4 and take a physics option in year 3.

Comprehensive Examinations and Professional Skills III (12 ECTS). All students take the two Comprehensive examinations, prepared for by approximately 24 weekly tutorials throughout Terms 1 and 2. Professional Skills III (an assessed presentation) counts 11% of the element.

Music III (45 ECTS). Students take the RCM Practical Musicianship course (10 ECTS), Aural training from year 2 (5 ECTS) and Principal Study (30 ECTS).

Term Three:
All examinations take place in term 3.

Students must pass all 3 elements at 40% to proceed directly to year 4. Students who fail any element are required to attend the September resits for those components in which they achieved less than 40%, following which those who pass their failed elements will be qualified to proceed. Those who fail to achieve 40% for any element are required to withdraw and may have one more resit attempt the following summer.

Year Four:
The whole of Year 4 counts 27.52% towards the final degree mark, 24 ECTS physics and 40 ECTS music.

Terms one and two:
Physics Options IV for Musicians (total 24 ECTS): All students choose four options (27 lectures, 6 ECTS each) from a list of specialised lecture courses at Level 3, including laboratory and languages/humanities/management courses. They may include in these choices up to one Level 2 course and one Level 4 course. Prerequisites are indicated in course documentation.

Music IV (40 ECTS). Students take Principal Study at the RCM.

Students are able to include in their option choices up to one RCM option course. They may also reduce the Principal Study component in order to take an additional option if they so wish.

Term Three:
All examinations take place in term 3.

Students must pass both elements at 40% overall in order to gain a degree. Students who fail any element are required to attend the September resits for those components in which they achieved less than 40%, following which those who pass their failed elements will be qualified to graduate. Those who fail to achieve 40% for any element are required to withdraw and may have one more resit attempt the following summer.

A final degree class is awarded on the basis of the final mark (see section 22).

18. Support provided to students to assist learning (including collaborative students, where appropriate):

At Imperial:

- Course handbook (also at https://workspace.imperial.ac.uk/physics/Internal/students/ug/info/Freshers%20Handbook/Freshers%20Handbook%202011.pdf)
- Departmental web site (www.imperial.ac.uk/physics) with details of all degree programmes, lecture courses, laboratory work and projects, as well as staff contact details and other information
- Blackboard web site providing electronic resources including lecture course handouts, problem sheets and solutions, discussion forums and online quizzes
- Induction talks and meetings in the first week
- Occasional meetings about course structure, option choices etc spread throughout the programme
- Weekly seminars in the first year to facilitate student networking, to provide an occasion for students to support each other and mutually develop under guidance their study skills
- Seminars in the second year to give guidance on essay writing and the preparation of a CV
- Seminars in the third year to develop presentation skills
- A personal tutor, providing pastoral support, staying with the student throughout all four years
- A Senior Tutor available by appointment throughout each term
- College Tutors
- The Health Centre and student counsellors available on site
- A Union advisor
- Academic tutorials with a member of academic staff in years 1, 2 & 3; further tutorials with post-doctoral Research Associates in years 2 and 3
- ‘Office Hours’ when course lecturers are available for consultation
- A Computer Suite with about 100 PCs with access to Blackboard, email, the world-wide web and other software including MS Office, a C++ compiler and Matlab.
- Facilities for scanning, photocopying and printing
- A central library containing multiple copies of all course texts and giving access to a wide range of electronic resources
- Two study areas and a room containing copies of text books within the department
- College booklet on ‘Learning to Learn’
- A student common room area with drinks and nibbles available
- A staff/student committee meeting monthly during term
- Nine student representatives
- A student ‘PhySoc’ society
- A departmental careers officer and a College careers service
- A centralised undergraduate office open 9-5 during term providing information and copies of all handouts
- Three well-equipped undergraduate laboratories with demonstrator support and staffed by technicians
- The teaching programme is informed through departmental links with industry and Government laboratories, individuals’ contacts with industry and departmental spin-off companies
- Practice rooms in the Blyth centre at Imperial
At the RCM:

- RCM website www.rcm.ac.uk
- RCM BMus handbook http://www.rcm.ac.uk/?pg=901
- Individual syllabuses for all core Level 1 and Level 2 courses and the majority of Level 2 and Level 3 options
- Induction talks and meetings in the first week, and at key stages in the programme
- Tutorial advice in Year 2 from Area Leaders to support work in the core units
- The Woodhouse Centre, a support unit offering advice in career and professional development, publicity, teaching and external engagements, contact with RCM alumni and with external advisors
- Student Services Manager and Student Counsellor
- Hall of Residence and support for finding private accommodation
- A centralised Registry open 9—5 throughout the year; access to key programme and faculty staff in office hours
- Concert and recital halls, Opera Theatre, practice facilities, electronic keyboard skills laboratory
- A Library for research, reference, listening and lending (containing over 400,000 items); the Museum of Instruments (housing 600 instruments); the RCM Studios (providing digital recording, post-production and editing facilities and a composers' studio); the Centre for Performance History (housing 340 original paintings, 10,000 prints/photographs and 750,000 concert programmes)
- Piano Workshop; resident luthier; gamelan; Alexander Technique; instrumental loan fund
- The Centre for Performance Science (CPS) and the Centre for Screen Music Studies (CSMS)
- IT facilities with access to email, internet (including an internet café) and to specialist score-writing software on PCs equipped with music keyboards
- A student common room/bar and dining room
- Student representation on academic committees and feedback opportunities each year
- Facilities for photocopying and printing
- RCM Student Association

Because this is a demanding programme, students receive individual support from the Senior Tutor (Imperial), the Imperial Director of Music, and the Head of Undergraduate Programmes (RCM)

19. Criteria for admission:

Students must satisfy admission criteria at both Imperial and the RCM. The RCM auditions suitable candidates, usually in February. The minimum qualifications for admission are three full GCE A-levels at grades A*AA (380 UCAS points) including Mathematics (at A*) and Physics. The third A level is not specified, but it is usually Chemistry or Further Mathematics, and it must not be General Studies. Scottish qualifications (Advanced Highers) are considered on the basis of their equivalence under the UCAS tariff. Eligible overseas qualifications are the International, European and French Baccalaureates, the German Abitur and certain other qualifications giving university entrance in other countries. Other qualifications are considered on an individual basis; applicants must provide evidence of ability to study at a high level.

20. Processes used to select students:

All UK students are invited to interview where they are given an introduction to the Physics department and the degree programmes by a member of the admissions team, followed by an individual interview. They are also taken on a short tour of the campus by a current undergraduate. Admissions decisions are based on the UCAS application form and feedback from the interviewer. Students must also pass the RCM audition. Overseas applicants are dealt with on an individual basis.

21. Methods for evaluating and improving the quality and standards of teaching and learning
a) Methods for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards:

At Imperial:

The external examiner system and Boards of Examiners are central to the process by which the College monitors the reliability and validity of its assessment procedures and academic standards. Boards of Examiners comment on the assessment procedures within the College and may suggest improvements for action by relevant departmental teaching Committees.

The Faculty Studies Committees review and consider the reports of external examiners and accrediting bodies and conduct periodic (normally quinquennial) and internal reviews of teaching provision. Regular reviews ensure that there is opportunity to highlight examples of good practice and ensure that recommendations for improvement can be made.

At programme level, the Head of Department/Division has overall responsibility for academic standards and the quality of the educational experience delivered within the department or division.

Most of the College’s undergraduate programmes are accredited by professional engineering and science bodies or by the General Medical Council. Accreditation provides the College with additional assurance that its programmes are of an appropriate standard and relevant to the requirement of industry and the professions.

At the RCM:

- annual monitoring report
- reports from RCM External Examiners
- 5-6 year programme review by a panel of internal and external specialists
- a team of Area Leaders for core units who monitor the course and assist in course and examination preparation
- peer observation
- use of external specialist assessors in practical examinations at Level 2 and above; internal monitoring of performance standards through feedback from external assessors, adjudicators and masterclass visitors
- periodic institutional audit by QAA

b) Committees with responsibility for monitoring and evaluating quality and standards:

At Imperial:

The Senate oversees the quality assurance and regulation of degrees offered by the College. It is charged with promoting the academic work of the College, both in teaching and research, and with regulating and supervising the education and discipline of the students of the College. It has responsibility for approval of changes to the Academic Regulations, major changes to degree programmes and approval of new programmes.

The Quality Assurance Advisory Committee (QAAC) is the main forum for discussion of QA policy and the regulation of degree programmes at College level. QAAC develops and advises the Senate on the implementation of codes of practice and procedures relating to quality assurance and audit of quality and arrangements necessary to ensure compliance with national and international standards. QAAC also considers amendments to the Academic Regulations before making recommendations for change to the Senate. It also maintains an overview of the statistics on completion rates, withdrawals, examination irregularities (including cases of plagiarism), student appeals and disciplinaries.

The Faculty Studies Committees and Graduate School Postgraduate Quality Committees are the major vehicle for the quality assurance of undergraduate / postgraduate courses respectively. Their remit includes: setting the standards and framework, and overseeing the processes of quality assurance, for the areas within their remit; monitoring the provision and quality of e-learning; undertaking reviews of new and existing courses; noting minor changes in existing programme
curricula approved by Departments; approving new modules, changes in module titles, major changes in examination structure and programme specifications for existing programmes; and reviewing proposals for new programmes, and the discontinuation of existing programmes, and making recommendations to Senate as appropriate.

The **Faculty Teaching Committees** maintain and develop teaching strategies and promote inter-departmental and inter-faculty teaching activities to enhance the efficiency of teaching within Faculties. They also identify and disseminate examples of good practice in teaching.

**Departmental Teaching Committees** have responsibility for the approval of minor changes to course curricula and examination structures and approve arrangements for course work. They also consider the details of entrance requirements and determine departmental postgraduate student numbers. The Faculty Studies Committees and the Graduate School Postgraduate Quality Committees receive regular reports from the Departmental Teaching Committees.

The **Imperial/RCM Liaison Committee** meets each year to review the programme including students’ progress and reports from external examiners.

**At the RCM:**

- Undergraduate Programmes Committee and working groups
- Undergraduate Board of Examiners
- Undergraduate Sub-Board of Examiners
- Senate (Board of Professors)
- Learning Resources Group

c) **Mechanisms for providing prompt feedback to students on their performance in course work and examinations and processes for monitoring that these named processes are effective:**

**At Imperial:**

- All students receive feedback on their progress from their academic tutor in weekly tutorials.
- Assessed coursework in Years 1 and 2 is returned to students with comments within approximately one week of submission. Students may discuss their marks with their academic tutor if they wish.
- Laboratory and computing reports are returned to students normally within 2 weeks of submission and students have the opportunity of discussing their report with the marker if they wish. Heads of Laboratories are responsible for ensuring that feedback is prompt and effective.
- Students are encouraged to discuss their examination performance with their Personal Tutor.

**At the RCM:**

d) **Mechanisms for gaining student feedback on the quality of teaching and their learning experience and how students are provided with feedback as to actions taken as a result of their comments:**

**At Imperial:**

- Feedback is obtained from students mainly through the representatives on the Staff Student Committee which meets monthly during term.
- Comments are also passed through academic tutors, personal tutors, the Senior Tutor and the Undergraduate Office
- Significant items are passed to the Teaching Committee for further discussion and action if appropriate.
• Minutes from the Staff Student Committee are posted on the web and circulated to the members of the committee.
• Feedback from SOLE and from other Departmental surveys on teaching is considered at both the Staff Student Committee and the Teaching Committee.
• Students are also encouraged to discuss any teaching issues with their lecturers, laboratory demonstrators and tutors.
At the RCM:

- annual student course evaluation questionnaires and periodic student resource questionnaires
- Study Plans
- module evaluations for some units
- student representation on College committees
- annual meeting of students with RCM External Examiners
- meetings between Student Association Year Representatives and the Head/Deputy Head of Undergraduate Programmes
- student/staff forums

All matters relating to the joint programme are discussed at the annual Liaison Committee meeting in July.

e) Mechanisms for monitoring the effectiveness of the personal tutoring system:

- Feedback from students to the Senior Tutor
- Feedback from students to the Staff Student Committee
- SOLE questionnaire results
- Departmental surveys on personal tutoring

f) Mechanisms for recognising and rewarding excellence in teaching and in pastoral care:

Imperial staff are encouraged to reflect on their teaching, in order to introduce enhancements and develop innovative teaching methods. Each year College awards are presented to academic staff for outstanding contributions to teaching, pastoral care or research supervision. A special award for Teaching Innovation, available each year, is presented to a member of staff who has demonstrated an original and innovative approach to teaching. Nominations for these awards come from across the College and students are invited both to nominate staff and to sit on the deciding panels.

Within the department, the following additional mechanisms operate

- Departmental informal “Lecturer of the Year” competition
- Feedback from students to Staff Student Committee leading to nominations for College Teaching and Pastoral Care awards
- SOLE questionnaire results
- Informal feedback via academic and personal tutors

g) Staff development priorities for this programme include:

- Active research programme in physics and music
- Early in the probation period, lecturers attend an initial series of five workshops on teaching and learning
- Probationary lecturers are assigned a mentor who monitors and advises them on teaching
- New staff are required to take the College CASLAT learning and teaching certificate before completing probation
- Staff are appraised annually
- Staff are encouraged to attend College courses on teaching and learning and on professional development
- Graduate Teaching Assistants attend a workshop on demonstrating, and receive training on their particular teaching activity
- Staff are encouraged to join the Higher Education Academy (HEA)
- Staff are encouraged to attend meetings of the Institute of Physics Higher Education Group and the HEA
22. Regulation of Assessment

Assessment Rules and Degree Classification:

For undergraduate programmes classification of degrees will be according to the following range of marks:

- First class: 70.0 - 100%
- Second class (upper division): 60.0 - 69.9%
- Second class (lower division): 50.0 - 59.9%
- Third class: 40.0 - 49.9%

a) Marking Schemes for undergraduate and postgraduate taught programmes:

The Pass Mark for all undergraduate modules is 40%. From October 2008 entry all undergraduates are required to pass all their course units to progress to the next year.

For written examinations, marking schemes are specific to a particular examination. Please note that the department applies modest scaling to examination results if the results give an anomalous number of failures or first class marks.

For undergraduate laboratory/computing and project assessment schemes, please see:
- [http://www3.imperial.ac.uk/physicsuglabs/firstyearlab/assessment](http://www3.imperial.ac.uk/physicsuglabs/firstyearlab/assessment) (Year 1)
- [http://www3.imperial.ac.uk/physicsuglabs/thirdyearlab/assessment](http://www3.imperial.ac.uk/physicsuglabs/thirdyearlab/assessment) (Year 4)
- [http://www3.imperial.ac.uk/physicsuglabs/thirdyearprojects/assessment](http://www3.imperial.ac.uk/physicsuglabs/thirdyearprojects/assessment) (BSc projects)

b) Processes for dealing with mitigating circumstances:

For undergraduate programmes: Candidates with mitigating circumstances are not subject to the borderline restrictions but should be considered individually. However, as a general principle, candidates whose marks are more than 5% below the borderline should not normally be raised to the next higher classification. Where the Board of Examiners determines that a higher classification should be awarded extra marks should be applied to bring the final marks into the higher range.

c) Processes for determining degree classification for borderline candidates:

For undergraduate programmes: Candidates who fall no more than 2.5% below the minimum mark for a higher honours classification shall be eligible for review of their final classification; this review could include an oral examination or practical test or other mechanism appropriate to the discipline. Candidates whose marks are below the 2.5% borderline may be considered for a higher honours classification where certain provisions apply. In the Physics department, borderline candidates and normally given an oral examination (conducted by an external examiner together with an internal examiner). Where the Board of Examiners determines that a candidate should be awarded a higher honours classification extra marks should be applied to bring their final marks into the higher range. Detailed records of all decisions should be recorded in the minutes of the meeting of the Board.
d) Role of external examiners:

One of the RCM External Examiners is also appointed as an Imperial External Examiner to cover this programme. This examiner attends a representative sample of Recitals for the joint programme students.

The primary duty of external examiners is to ensure that the degrees awarded by the College are consistent with that of the national university system. External examiners are also responsible for approval of draft question papers, assessment of examination scripts, projects and coursework (where appropriate) and in some cases will attend viva voce and clinical examinations. Although external examiners do not have power of veto their views carry considerable weight and will be treated accordingly. External examiners are required to attend each meeting of the Board of Examiners where recommendations on the results of individual examinations are considered. External examiners are required to write an annual report to the Rector of Imperial College which may include observations on teaching, course structure and course content as well as the examination process as a whole. The College provides feedback to external examiners in response to recommendations made within their reports.

23. Indicators of Quality and Standards

- Favourable comments by External Examiners
- High proportion of students achieving a high degree classification
- Positive reports from external audit reviews and accreditation visits (The Institute of Physics Accreditation report (2004) is available from the Department)
- First destination data for BSc and MSci graduates, showing a high proportion find appropriate employment or enter further postgraduate training
- Independent review of the quality of the educational provision of the Physics Department by the Quality Assurance Agency subject review process in 1998 achieving an excellent grading of 22 out of a maximum 24 points
- Favourable reviews of the RCM programmes by the Quality Assurance Agency

24. Key sources of information about the programme can be found in

Physics course handbook:
https://workspace.imperial.ac.uk/physics/Internal/students/ug/info/Freshers%20Handbook/Freshers%20Handbook%202011.pdf

Course syllabus:
https://www8.imperial.ac.uk/content/dav/ad/workspaces/college/pdfs/ugsyllabus/UG_syllab_Physics_11-12.pdf
Prospectus:
http://www3.imperial.ac.uk/ugprospectus/facultiesanddepartments/physics
Physics Admissions website:
http://www3.imperial.ac.uk/physics/admissions
Department of Physics website
http://www3.imperial.ac.uk/physics
RCM BMus(Hons) Programme Handbook
www.rcm.ac.uk
RCM student prospectus
www.rcm.ac.uk