Programme Specification for the MRes in Molecular and Cellular Biosciences

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 http://www3.imperial.ac.uk/pgprospectus/facultiesanddepartments/lifesciences/postgraduatecourses. 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
3. External Accreditation by Professional / Statutory Body: Not applicable
4. Name of Final Award (BEng / BSc / MEng etc): MRes
5. Programme Title (e.g. Biochemistry with Management): Molecular and Cellular Biosciences
6. Name of Department / Division: Life Sciences
7. Name of Faculty: Natural Sciences
8. UCAS Code (or other coding system if relevant): Not applicable
9. Relevant QAA Subject Benchmarking Group(s) and/or other external/internal reference points: Biosciences is the study of the chemical processes which support life. It requires knowledge of key chemical principles which are relevant to biological systems and includes the structure and function of biological molecules and cellular metabolism and its control.
10. Level(s) of programme within the Framework for Higher Education Qualifications (FHEQ): Master’s (MSc, MRes)
Level 7
11. Mode of Study Full-time
12. Language of Study: English
13. Date of production / revision of this programme specification (month/year): November 2012
14. Educational aims/objectives of the programme

The programme aims/objectives are to:

• provide education in Molecular and Cellular Biosciences and state of the art practical training;
• produce graduates with broad research and analytical skills related to the application of biochemical knowledge;
• encourage an analytical approach to a wide range of topics relevant to research and industry;
• equip students to carry out modern postgraduate biomedical/biochemical research at university or in industry;
• equip students to pursue careers in industry, the public sector and non-governmental organisations;
• provide training in communication of scientific results and in IT computational methods;
• attract highly motivated students, both from within the UK and from overseas;
• develop new areas of teaching in response to the advance of scholarship and the needs of professional training.
15. Programme Learning Outcomes:

A. Knowledge and Understanding

At the conclusion of the programme, students should have experienced research encompassing a range of topics and techniques relevant to pursuing a career in more than one area of biomedically relevant research, as appear in (but not limited to) the list below:

- Biological chemistry
- Biological structure and function
- Biophysics
- Cell and molecular biology
- Molecular neurosciences
- Molecular microbiology and infection
- Structural biology
- Glycobiology
- Immunology
- Molecular biosciences
- Plant and microbial sciences

Students should obtain detailed knowledge and understanding of

A1. the essential facts, concepts, principles and theories relevant to the student’s chosen area of specialisation
A2. research techniques including information retrieval
A3. experimental design and statistics
A4. critical assessment of results and conclusions
A5. written and verbal presentations and the use of computers for analysis and display of data
A6. laboratory safety
A7. management and communication skills, including problem definition, project design, decision processes, teamwork, written and oral reports, scientific publications.

Teaching/learning methods and strategies:

- Each student carries out three research projects based in the research laboratories of the Department of Life Sciences;
- students attend seminars and tutorials;
- assessment of the knowledge and understanding is through project reports, presentations and vivas.

B. Intellectual Skills:

Students should obtain the ability to

B1. analyse and solve biochemical problems using an integrated multidisciplinary approach;
B2. integrate and evaluate information;
B3. formulate and test hypotheses using appropriate experimental design and statistical analysis of data;
B4. plan, conduct and write-up a programme of original research.

Teaching/learning methods and strategies:

- Intellectual skills are developed through the teaching and learning methods outlined above and in section 17. Information sifting and sorting, analysis and problem solving skills,
experimental design and statistical skills are promoted through the execution of three research projects.

- Individual, formative and summative feedback is given to students on all work produced including oral presentations.
- Assessment is by research project report, oral presentation and viva voce.

C. Practical Skills:
C1. plan and execute safely a series of experiments;
C2. use laboratory methods to generate data;
C3. analyse experimental results and determine their strength and validity;
C4. prepare technical reports;
C5. give technical presentations;
C6. use the scientific literature effectively;
C7. use computational tools and packages.

Teaching/learning methods and strategies
- Practical skills are developed through the teaching and learning programme outlined above and in section 17.
- Practical experimental skills (C1 to C3) are developed through laboratory, computer-based and project work.
- Skills C4 and C5 are taught and developed through feedback on reports written and presentations made.
- Skill C6 is developed through seminars and the individual supervised research projects.
- Skill C7 is taught and developed through project work.
- Practical skills are assessed through the project work and the research project reports.

D. Transferable Skills:
D1. communicate effectively through oral presentations, computer processing and presentations, written reports and scientific publications;
D2. apply statistical and modelling skills;
D3. management skills: decision processes, objective criteria, problem definition, project design and evaluation, risk management, teamwork and coordination, extension needs;
D4. integrate and evaluate information from a variety of sources;
D5. transfer techniques and solutions from one discipline to another;
D6. use Information and Communications Technology;
D7. manage resources and time;
D8. learn independently with open-mindedness and critical enquiry;
D9. learn effectively for the purpose of continuing professional development.

Teaching/learning methods and strategies
- Transferable skills are developed through the teaching and learning programme outlined above and in section 17.
- Skill D1 is taught through coursework and developed through feedback on reports, essays and oral presentations.
- Skill D2 is taught through individual research projects.
- Skills D3 to D5 are developed through project work.
- Skill D6 is developed through computer-based exercises, projects and individual learning.
- Skill D7 is developed throughout the course within a framework of staged coursework deadlines.
- Although not explicitly taught, skills D8 and D9 are encouraged and developed throughout the course, which is structured and delivered in such a way as to promote this.
• Skill D1 is assessed through project work, presentations, project reports and the oral examinations.
• Skills D2 to D5 are assessed through project work.
• The other skills are not assessed formally.

16. The following reference points were used in creating this programme specification
• Subject benchmarking information for Biociences.
• Student Handbook for Course approved by Senate of Imperial College London

17. Programme structure and features, curriculum units (modules), ECTS assignment and award requirements:
Year One:
The course comprises three individual (16-17 weeks) research projects followed by a viva voce with the departmental examiners. The overall pass mark is 50% and each element of the course contributes 33.3% of the final mark. A final viva voce with the Visiting Examiners takes place at the conclusion of the course.
During the course students must also attend seminars from the divisional research seminar programme, the PhD seminar programme and the GSLSM Academic Training Programme.
Term one:
Project 1
All students attend an induction week and discuss possible research projects with appropriate academic staff. Projects suggested by departmental staff are distributed to students before the start of the course and are available on the student web pages. Projects begin in the second week of the Autumn Term (17 weeks). Students also attend research seminars, submit a written dissertation of their first project and give a presentation of their project to an audience of academic staff and other students. Students are examined by a viva voce.
Term Two:
Project 2
Projects suggested by departmental staff are distributed to students and are available on the student web pages. Students discuss possible research projects with appropriate academic staff and begin their second project in the second week of the Spring Term (16 weeks). Students also attend research seminars, then submit a written dissertation of their second project and give an oral presentation of their project. Students are examined by a viva voce.
Term Three:
Project 3
Projects suggested by departmental staff are distributed to students and are available on the student web pages. Students discuss possible research projects with appropriate academic staff and begin their third project in the second week of the Summer Term (17 weeks). Students also attend research seminars. Students submit a written dissertation of their third project, give a presentation of their project, and are examined by a viva voce. All students are examined by viva voce on their projects and other aspects of the course by the Visiting Examiners, prior to the MRes Examination Board meeting in September.
Each Research Project is assigned 30 ECTS. Total programme is equivalent to 90 ECTS.

18. Support provided to students to assist learning (including collaborative students, where appropriate):
• One week induction programme for orientation, introduction to library, information technology and safety
• MRes Student Handbook
• Staff : student ratios for teaching of 1:1
• A large community of postgraduate research students and postdoctoral research workers who work at South Kensington
• Library and other learning resources and facilities at South Kensington
• Dedicated computing facilities at South Kensington with access throughout each day
• An MRes staff-student committee, which meets regularly throughout the year
• Open access to staff in the Department of Life Sciences
• Numerous Life Science seminar series which run throughout the year
• Postgraduate tutors at South Kensington who have overall responsibility for student welfare and guidance
• Personal mentors who assist students with personal problems and advise on pastoral and academic issues
• Student email and open personal access to tutorial staff including the Course Director
• Access to student counsellors on the South Kensington site
• Access to Teaching and Learning Support Services, which provide assistance and guidance, e.g. on careers
• Skills development courses and workshops organised by the Graduate School of Life Sciences and Medicine

19. Criteria for admission:
The minimum qualification for admission is normally an Upper Second Class Honours degree in a Life Science or related subject from a UK academic institution or an equivalent overseas qualification.

20. Processes used to select students:
Offers made to students are initiated by the MRes Management Committee. Where an applicant has a lesser degree qualification but has relevant research experience, a special case for admission may be submitted to the Graduate School Masters Quality Committee by the Course Director, on recommendation of the Management Committee.

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:
The external examiner system and Board of Examiners are central to the process by which the College monitors the reliability and validity of its assessment procedures and academic standards. Board of Examiners comments on the assessment procedures within the College and may suggest improvements for action by the Departmental Postgraduate Committee. The Faculty Studies Committee and the Graduate School’s Postgraduate Quality Committee review and consider the reports of external examiners 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 has overall responsibility for academic standards and the quality of the educational experience delivered within the Department of Life Sciences.

Mechanisms for review and evaluation
• Course reviews, based on feedback questionnaires and convenor reports
• Annual course review prepared by the Course Director and considered by the Course Committee
• Biennial review of the course by an Imperial College academic staff member from outside the department with a report and grading to the Graduate School Masters Quality Committee.
• MRes Staff-Student Committee, held each term, with report to Course Committee
• External Examiner reports
• Periodic review of departmental teaching by an external panel with members drawn from another university, a research institute and industry
• Employer needs and opinions feed into the programme through guest lecturers from industry and collaboration between academic staff and industry in research and consultancy

B. Committees with responsibility for monitoring and evaluating quality and standards:
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 disciplines.

The Faculty Studies Committee and Graduate School Masters Quality Committee 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 Committee maintains and develops teaching strategies and promotes inter-departmental and inter-faculty teaching activities to enhance the efficiency of teaching within Faculty. It also identifies and disseminates examples of good practice in teaching. Departmental Teaching Committee has responsibility for the approval of minor changes to course curriculum and examination structure and approves arrangements for course work. It also considers the details of entrance requirements and determines departmental postgraduate student numbers. The Faculty of Natural Sciences Studies Committee and the Graduate School of Life Sciences and Medicine Postgraduate Quality Committee receive regular reports from the Divisional Teaching Committee.

Additional committees
• Board of Examiners – meets after each rotation to moderate results and in September to consider awards
• MRes Course Management Committee
• MRes Staff – Student Committee

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:
• during each Project: meetings with personal mentors;
• during each Project: MRes Staff–Student Committee;
• at the end of each Project: prompt return of letter grades;
• at the end of each Project: feedback forms prepared by the course director and containing specific comments from the supervisor/s, examiners and the course director;
• at the end of course: viva voce with External Examiners.

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:
• during the course: MRes Staff–Student Committee
• during the course: meetings with personal mentors
• at the end of course: course questionnaire evaluation of the projects and course as a whole
• at the end of course: viva voce with External Examiners

E. Mechanisms for monitoring the effectiveness of the personal tutoring system:
• meetings of mentors with personal tutees;
• MRes Staff–Student Committee;
• course questionnaire evaluation of course as a whole;
• viva voce with External Examiner.

F. Mechanisms for recognising and rewarding excellence in teaching and in pastoral care:
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.

G. Staff development priorities for this programme include:
• active research programme
• staff appraisal scheme and institutional staff development courses
• updating professional and IT/computing developments

22. Regulation of Assessment

a) Assessment Rules and Degree Classification:
The Pass Mark for the MRes in Molecular and Cellular Biosciences course is 50%. In order to be awarded a result of Merit, a candidate must obtain an aggregate mark of 60% or greater; a result of Distinction requires an aggregate mark of 70% or greater.
Where appropriate, the Board of Examiners may award a result of Merit where a candidate has achieved an aggregate mark of 60% or greater across the programme as a whole AND has obtained a mark of 60% or greater in each element with the exception of one element AND has obtained a mark of 55% or greater in this latter element.
Where appropriate, the Board of Examiners may award a result of Distinction where a candidate has achieved an aggregate mark of 70% or greater across the programme as a whole AND has obtained a mark of 70% or greater in each element with the exception of one element AND has obtained a mark of 65% or greater in this latter element.

b) Marking Scheme:
• Assessment details are provided in the MRes Student Handbook
• Minimum pass mark is 50% for each project
• To qualify for the award of MRes students must complete all the course requirements and must achieve an overall pass mark in all three research projects
• The three research projects carry equal weighting
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<td>A</td>
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<td>60% - 69%</td>
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<td>C</td>
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<td>D</td>
<td>40% - 49%</td>
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<td>E</td>
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**INTERPRETATION**

Marks represent a Distinction performance
Marks represent a Merit performance
Marks represent a Pass
Marks represent a fail performance at MRes level
Marks represent a fail performance (with major shortcomings)

c) Processes for dealing with mitigating circumstances:
A candidate for a Master’s degree who is prevented owing to illness or the death of a near relative or other cause judged sufficient by the Graduate Schools from completing at the normal time the examination or Part of the examination for which he/she has entered may, at the discretion of the Examiners,
(a) Enter the examination in those elements in which he/she was not able to be examined on the next occasion when the examination is held in order to complete the examination, or
(b) be set a special examination in those elements of the examination missed as soon as possible and/or be permitted to submit any work prescribed (e.g. report) at a date specified by the Board of Examiners concerned. The special examination shall be in the same format as specified in the course regulations for the element(s) missed.
Applications, which must be accompanied by a medical certificate or other statement of the grounds on which the application is made, shall be submitted to the Academic Registrar who will submit them to the Board of Examiners.

d) Processes for determining degree classification for borderline candidates:
Candidates should only be considered for promotion to pass, merit or distinction if their aggregate mark is within 2.5% below the relevant borderline. Nevertheless, candidates whom the Board deems to have exceptional circumstances may be considered for promotion even if their aggregate mark is more than 2.5% below the borderline. In such cases, the necessary extra marks should be credited to bring the candidate’s aggregate mark into the higher range.

e) Role of external examiners:
The visiting examiners (from other universities and research institutes in the UK) are nominated by the MRes Management Committee and approved by the Graduate School. External examiners normally serve for 4 years. 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. In order to carry out their role, external examiners conduct oral examination (viva voce) of each student. External examiners also see all three research project reports and are responsible for the assessment of the marks awarded for each project. 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 the Joint meeting of the Board of Examiners where recommendations on the course results 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
   - Favourable comments and feedback from students
   - First destination data for MRes graduates, showing a majority starting a PhD on completion of the course
   - Review of the Course by the Graduate School of Life Sciences and Medicine Postgraduate Quality Committee in 2007, achieving the maximal qualification of “Good”

24. Key sources of information about the programme can be found in:
   - Postgraduate Prospectus, Imperial College London (available on-line http://www3.imperial.ac.uk/pgprospectus)
   - http://www3.imperial.ac.uk/pgprospectus/facultiesanddepartments/lifesciences and http://www3.imperial.ac.uk/lifesciences/postgraduate/courselist
   - MRes Course Handbook (available in electronic format on request from MRes Course Director: Dr Stephen G Brickley (s.brickley@imperial.ac.uk)
   - This document may be downloaded from the Imperial College web site (http://www.bio.ic.ac.uk/teaching/pg/MResProgrammeSpec.pdf)
   - To find out how to apply, please visit http://www3.imperial.ac.uk/pgprospectus/howtoapply/applicationforms
   - Information about the Department of Life Sciences can be obtained on-line at http://www3.imperial.ac.uk/lifesciences