Programme Specification for the MSc in The Molecular Biology and Pathology of Viruses

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://www1.imperial.ac.uk/medicine/mbpv/](http://www1.imperial.ac.uk/medicine/mbpv/)

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): MSc
5. Programme Title (e.g. Biochemistry with Management): Molecular Biology and Pathology of Viruses
6. Name of Department / Division: Division of Medicine
7. Name of Faculty: Faculty of Medicine
8. UCAS Code (or other coding system if relevant): A3SN
9. Relevant QAA Subject Benchmarking Group(s) and/or other external/internal reference points:
   Medicine
10. Level(s) of programme within the Framework for Higher Education Qualifications (FHEQ):

<table>
<thead>
<tr>
<th>Bachelor's (BSc, BEng, MBBS)</th>
<th>Level 6</th>
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<tbody>
<tr>
<td>Integrated Master's (MSci, MEng)</td>
<td>Levels 6 and 7</td>
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<tr>
<td>Master's (MSc, MRes)</td>
<td>Level 7</td>
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11. Mode of Study:
Full time

12. Language of Study: English

13. Date of production / revision of this programme specification (month/year):
August 2012

14. Educational aims/objectives of the programme

   1. MSc in The Molecular Biology and Pathology of Viruses
The programme aims/objectives are to:

- produce graduates equipped to pursue careers in academic or industrial research;
- provide a solid foundation for those who intend to go on to study for a PhD;
- develop understanding of processes at the molecular level;
- provide a training in laboratory and research skills;
- provide a supportive learning environment;
- 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 vocational training.

15. Programme Learning Outcomes:

1. Knowledge and Understanding

Knowledge and Understanding of:

1. fundamentals of molecular and cell biology;
2. the structure of viruses and their genomes;
3. the interaction of viruses with cells;
4. virus gene expression, modes of replication and transmission,
5. the pathogenesis of virus-induced diseases,
6. the detection, treatment and prevention of virus infections;
7. virus epidemiology and the genetics and evolution of viruses.
8. management and communication skills, including problem definition, project design, decision processes, teamwork, written and oral reports, scientific publications

Teaching/learning methods and strategies:

Acquisition of 1 to 7 is through a combination of lectures, laboratory work, tutorials and practical classes during the first 5 months of the course.
Acquisition of point 8 is through a combination of lectures, laboratory work, computer-based work, journal club sessions. Also during last 6 months of the course through the full-time, individual, supervised research project (March to end of August).

Throughout the students are encouraged to undertake independent reading both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.

Testing of the knowledge base is through a combination of unseen written examinations (1-8) and assessed coursework (1-7) in the form of laboratory write-ups (1-7), essays (1-7), an oral examination (1), group project reports and presentations (1-7) and the individual research project report and viva (8).

2. Skills and other Attributes

Intellectual Skills:

1. understand the nature of viruses and their role in disease pathogenesis;
2. integrate and evaluate information and data from a variety of sources;
3. formulate and test hypotheses;
4. be creative in the solution of problems and in the development of hypotheses;
5. plan, conduct and report a programme of original research.

Teaching/learning methods and strategies:

Intellectual skills are developed through the teaching and learning programme outlined above. Analysis and problem solving skills are further developed through the journal club sessions.
Experimental, research skills are further developed through coursework activities, laboratory experiments and later on through research project. The written exams held in February provide an important feedback on student’s progress.

Assessment of thinking skills is partly achieved through coursework, unseen written examinations and the individual research project but also in assessed practicals and assignments.

**Practical Skills:**

1. plan and execute safely a series of experiments;
2. use laboratory equipment to generate data;
3. analyse experimental results and determine their strength and validity;
4. prepare technical reports;
5. give technical presentations;
6. use the scientific literature effectively;
7. 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 (1 to 3) are developed through practicals and a research component. Skills (4) and (5) are taught and developed through feedback on reports written and presentations made as part of coursework assignments.

Skill (6) is developed through lectures, coursework reports and essays, and the individual supervised research project in term 2.

Skill (7) is taught and developed through coursework exercises and project work.

Practical skills are assessed through written reports of laboratory practicals, tutorials, student presentations and also through the research project dissertation.

**Transferable Skills/ Professional Skills Development:**

1. communicate effectively through oral presentations, computer processing and presentations, written reports;
2. integrate and evaluate information from a variety of sources;
3. transfer techniques and solutions from one discipline to another;
4. use Information and Communications Technology;
5. manage resources and time;
6. learn independently with open-minded and critical enquiry;
7. 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 1 is taught through coursework and developed through feedback on reports, essays and oral presentations.

Skills 2 and 3 are developed through coursework and project work.

Skill 4 is developed through computer-based exercises, projects and other coursework activities and individual learning.

Skill 5 is developed throughout the course within a framework of staged coursework and research project deadlines and also the split examination system.

Although not explicitly taught, skills 6 and 7 are encouraged and developed throughout the course, which is structured and delivered in such a way as to promote this.
Skill 1 is assessed through coursework reports, presentations, written examinations and the oral examination.

Skill 2 is assessed through coursework, written examinations and project work.

Skills 3 to 5 are assessed in workshops.
The other skills are not assessed formally.

The college through Disability Advisory Service provides a variety of support initiatives in order to enable students who have a disability, specific learning difficulty such as dyslexia, or long-term physical or mental health related issue to achieve their full potential.

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

- Subject benchmarking information for Medicine.
- Student Handbook/SOP for Course approved by Senate of Imperial College

17. Programme structure and features, curriculum units (modules), ECTS assignment and award requirements:

The course is comprised of two elements, a taught component which will be given over the first part of the course and a research component which will be given over the remainder of the session. The taught component will include lectures, laboratory practicals, tutorials and student presentations, and is divided into 6 modules based on a particular theme (see below). Laboratory based practicals will be held throughout the first part of the course. A written report of each practical will be required and these will each be assigned a mark. A full-time laboratory based research project will be carried out in one of the Departments associated with the MSc course from the beginning of March until the end of August (approximately 24 weeks). On completion of the project a written report will be produced and submitted for an examination followed by a viva in September with the External Examiner.

Term one: The taught part (element) will be given over the first half of the course is comprised of lectures, laboratory practicals, journal clubs, tutorials and student presentations divided into 6 modules based on a particular theme:

1. MSc Core Curriculum
2. Virus Architecture and Virus Interactions with Cells
3. Virus Genomes, Gene Expression and Replication
4. Virus Disease
5. Diagnosis, Vaccines and Therapies
6. Epidemiology, Transmission and Evolution of Viruses

Laboratory based practicals are held throughout taught part of the course and written report of each practical is required. Students are advised to start discussing possible research projects with appropriate academic staff. Projects suggested by College staff or solicited from external Research Institutes and Companies are available to students by the end of November.

Term Two:

In the remaining part of the course there are two, three hour, written papers based on the taught element of the course. Paper 1 – Main theme Molecular Biology of Viruses, Paper 2 – Main theme Viral Pathogenesis. The written examinations are held at the end of February. Laboratory based research projects start at the beginning of March and last until end of August (approx 24 weeks) when the written thesis has to be submitted. The length of the project is around 10,000 words. The projects are conducted at Imperial College’ St Mary’s Campus or, in part or in a whole, at external research institutions and companies in the UK. Where the projects are external, a member of Imperial College

4. MSc in The Molecular Biology and Pathology of Viruses
academic staff is assigned to advise and to monitor student progress. All students have a viva on their project with the External Examiner in the middle of September to determine their final mark.

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

- One week induction programme (Core Module) for introduction to course structure, library and computer facilities.
- First rate research groups provide excellent opportunities for student research projects.
- Library at St Mary’s Campus and also Imperial College Central Library on the South Kensington Campus.
- External speakers giving lectures to students.
- A fully equipped multi-user computer facility is available (on the St Mary’s campus).
- Advice on radiation safety giving a basic introduction on work in a laboratory.
- An MSc staff - student committee, which meets three times per year.
- Access to online course material on the Intranet (Blackboard).
- Students conducting their research projects at an external site are assigned a member of Imperial College academic staff to oversee progress and advise on the project dissertation. Where practical, students will be visited by college staff during their project.
- Free email and internet access.
- 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.
- Opportunities for students to conduct their research projects at external institutions and companies.
- The English Language Support Programme (ELSP) offers classes (general, writing, pronunciation and conversation) to students registered at Imperial College who are not native speakers of English and to academic staff in the college.
- The Career Advice and Planning session on the last day of the term carried out by the Careers Adviser.

19. Criteria for admission:

The minimum qualification for admission is normally a Lower Second Class Honours degree in a Science-based subject from an UK academic institution or an equivalent overseas qualification.

20. Processes used to select students:

Wherever possible the students are invited to St Mary’s Campus for an interview, offers of a place on the course are made to students based on the information received in the application form and two references (at least one academic). Where an applicant has a lesser degree qualification but has at least 3 years work experience in biology, agriculture or a related discipline, a special case for admission may be submitted to the Chairman of the Graduate School of Life Sciences and Medicine.

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 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 and the Graduate Schools’ Postgraduate Quality Committees review and consider the reports of external examiners and accrediting bodies and conduct periodic (normally
Mechanisms for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards:

- Course Units reviews, based on feedback questionnaires and convenor reports.
- 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 of Life Sciences and Medicine Postgraduate Quality Committee.
- MSc Staff – Student Committee, held each term, with report to Departmental Teaching Committee.
- Annual staff appraisal.
- Peer teaching observations.
- External Examiner reports.

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 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.

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:

All students receive personal feedback on assessments in a timely manner. Online self-assessment tasks allow tutors to monitor students individually and contact them if it is felt they are struggling. The tutorial system allows tutors to provide feedback typically within 1 week of the “assessment”.

Guidance and feedback is provided by project supervisors during the research work and when students are approaching the submission of a dissertation.

Details relating to feedback on exam performance are included in Student Handbooks. Students may be advised as to their “progress” after the examinations but are not informed of their marks at that time. Students are unable to challenge results, or obtain feedback until after the meeting of the Board of Examiners in September.

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:

- MSc Staff – Student Committee;
- meetings with personal tutees;
- course questionnaire;
- viva with External Examiner.

Students are provided with the feedback as a result of their comments during face to face discussions with the Course Director, teaching staff.

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

- Course Units reviews, based on feedback questionnaires and convenor reports.
- 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 of Life Sciences and Medicine Postgraduate Quality Committee.
- MSc Staff – Student Committee, held each term, with report to Departmental Teaching Committee.
- Annual staff appraisal.
- Peer teaching observations.
- External Examiner reports.

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

Staff is 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:

New examining academic staff are invited to the induction session at the South Kensington Campus. All new academic staff are required to attend the workshops run by the Centre for Education Development, where such training and guidance is also provided.

22. Regulation of Assessment:
a) Assessment Rules and Degree Classification:
Testing of the knowledge acquired is through a combination of written examinations, assessed coursework in the form of laboratory write-ups and essays, and the individual research project report and viva.

Assessment (2 Course Elements):

- Three Written Examination Papers & Assessment of Coursework (55% of the total mark)

The components of the Written Examination & Coursework Element would be as follows:

- Paper I: Molecular Biology of Viruses (36%)
- Paper II: Viral Pathogenesis, Host Responses and Virus Evolution (36%)
- Written Assignments (14%)
- Experimental Practicals (14%)

There are two, three hour, written papers based on the taught component of the course. The written examinations are held at the end of February. Continuous assessment is based on written assignments, reports of the practical classes and to some extent on student presentations. Timely feedback is provided to the students as soon as possible after the students completed the assessments.

Assessment deadlines are thoroughly discussed with the members of staff involved to avoid clashes and excessive assessment for students and staff. The curriculum teaching is linked to opportunities for students to show what they have learnt through completing the assessment. The adequate time is given to complete the assignments.

ECTS allocation: 30 ECTS

- Assessment of Project Report & Oral Examination (45% of the total mark)

Project reports are submitted by the end of August. An oral exam based on the project and other course work is normally held in late September to decide the final mark.

ECTS allocation: 60 ECTS

Assessment strategies and methods ensure that the knowledge, understanding, skills and attitudes set out previously are sufficiently covered. Methods must be both valid and reliable.

For postgraduate taught programmes: The Pass Mark for postgraduate taught courses 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, a 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 50% or greater in this latter element.

Where appropriate, a 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 60% or greater in this latter element.

b) Marking Schemes for undergraduate and postgraduate taught programmes:

The Pass Mark for all postgraduate taught course elements is 50%. Students must pass all elements in order to be awarded a degree.

c) Processes for dealing with mitigating circumstances:
For postgraduate taught programmes: 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,

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:

For postgraduate taught programmes: Candidates should only be considered for promotion to pass, merit or distinction if their aggregate mark is within 2.5% of 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% from 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 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.
- First destination data for MSc graduates, showing a high proportion find employment or further postgraduate research training in biomedical science.
- Independent review of the quality of education in medicine by the Quality Assurance Agency subject review process in Feb 2000 achieving a grading of 21 out of a maximum 24 points.

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

- Postgraduate Prospectus, Imperial College London (available on-line http://www1.imperial.ac.uk/medicine/teaching/postgraduate/default.html
- MSc course in the Molecular Biology and Pathology of Viruses: http://www1.imperial.ac.uk/medicine/mbpv/
- Imperial College Faculty of Medicine : http://www1.imperial.ac.uk/medicine/
- QAA Subject Review Report, Imperial College London (www.qaa.ac.uk).