

Programme Specification for the MSc. in Immunology

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/about/divisions/medicine/immunology/mscimmunology> The accuracy of the information contained in this document is reviewed by the College and may be checked by the Quality Assurance Agency.

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| 1. Awarding Institution: | Imperial College London |
| 2. Teaching Institution: | Imperial College London |
| 3. External Accreditation by Professional / Statutory Body: | N/A |
| 4. Name of Final Award (BEng / BSc / MEng etc): | MSc. and DIC |
| 5. Programme Title (e.g. Biochemistry with Management): | Immunology |
| 6. Name of Department / Division: | Immunology/Medicine |
| 7. Name of Faculty: | Medicine |
| 8. UCAS Code (or other coding system if relevant): | Course code: A3UZA |
| 9. Relevant QAA Subject Benchmarking Group(s) and/or other external/internal reference points: | N/A |
| 10. Level(s) of programme within the Framework for Higher Education Qualifications (FHEQ): | |

Master's (MSc)	Level 7
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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):** September/2010
- 14. Educational aims/objectives of the programme**

The programme aims/objectives are to:

Provide postgraduate students with backgrounds in either basic science, medicine, dentistry or veterinary science with an advanced academic and laboratory research training in modern cellular and molecular immunology, with emphasis on the interface between the basic and clinical aspects of the subject.

At the end of the taught component students should have a good understanding of:

- the molecular and cellular mechanisms involved in the development and regulation of the immune response,
- the way in which the immune system can be manipulated in the treatment of disease, in particular transplantation and cancer
- the ways in which defects in the immune system can lead to disease such as allergy and auto-immunity.
- the major immunological laboratory techniques and their application to both clinical analysis and experimental research.
- investigative and presentational skills developed through self-directed learning sessions.

At the end of the seven months research component the students will have:

- experienced a thorough training in the methods and ethos of laboratory research including:
 - The design of a good research project
 - Designing and planning of experiments
 - Trouble shooting for experimental problems
 - Data presentation, analysis and interpretation
 - Literature searching
 - Critical review
 - Preparation and presentation of work for publication (in the form of a written report)
 - A clear understanding of good laboratory practice, including safety.

15. Programme Learning Outcomes

1. Knowledge and Understanding

Knowledge and Understanding of:

- 1.1. Major mechanisms involved in the immune response
- 1.2. How the immune system can 'go wrong' to cause disease
- 1.3. How the immune system can be manipulated to prevent or treat disease
- 1.4. Latest research techniques and approaches
- 1.5. Research techniques, including molecular and cellular immunology and data handling, data storage and manipulation and laboratory safety
- 1.6. Management skills, including data storage and team work
- 1.7. Transferable skills including use of computer data bases and other computer skills
- 1.8. Communication skills, including written and oral reports, scientific publications.

Teaching/learning methods and strategies to achieve 1.1 – 1.8:

Acquisition of 1.1, 1.2, 1.3 and 1.4 is through a combination of lectures, seminars, 'third week self-directed learning', practical classes and tutorials. In addition acquisition of 1.4 is obtained during the research project. 1.5 is acquired during the practical classes, tutorials and the project work. 1.6 is acquired during the project work and the 'third week self directed learning'. Acquisition of 1.7 and 1.8 is through the 'third week self-directed learning', and through presentations (including thesis and oral presentation) during the project. 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. Summative assessment of the knowledge base is through a combination of unseen written examinations (including data analysis) (1-5), submission of a thesis (1.1-1.8), and an oral examination (1.1-1.8). Formative assessment of the third week self-directed learning allows assessment of 1.1-1.8.

2. Skills and other Attributes

Intellectual Skills:

Graduates will be able to:

- 2.1. Analyse & solve immunological problems
- 2.2. Integrate and evaluate information;
- 2.3. Formulate and test hypotheses using appropriate experimental design and statistical analysis of data
- 2.4. Conduct and write-up a programme of original research

Teaching/learning methods and strategies to achieve 2.1 – 2.4:

Intellectual skills are developed through the teaching and learning methods outlined above and in section 11. Analytical and problem solving skills are promoted through the use of tutorials as well as the third week self directed learning. Experimental design and data analysis skills are developed in lectures and practical work in the taught component of the course and subsequently in the individual research project. Individual, formative feedback is given to students on all work produced including oral presentations and essays set by individual tutors. Group formative feedback is provided on the third week self directed learning task. The written exams, held in February, provide important summative feedback on student progress.

Practical Skills:

Graduates will be able to:

- 2.5. Plan and safely execute experiments
- 2.6. Generate data from experiments
- 2.7. Analyse experimental results and determine their strength and validity
- 2.8. Prepare research reports
- 2.9. Give research presentations
- 2.10. Use the scientific literature effectively
- 2.11. Use computational tools and packages

Teaching/learning methods and strategies to achieve 2.5 – 2.11:

Practical skills are developed through the teaching and learning programme outlined above (and in section 14). Practical experimental skills (2.5 to 2.7) are developed through laboratory, and project work. Skills 2.8 and 2.9 are taught and developed through feedback on presentations made during the third week self directed learning, oral presentations during the project and as feedback during the preparation of the thesis. Skill 2.10 is developed through lectures, essays, third week self-directed learning and the individual supervised research project. Skill 2.11 is taught and developed through laboratory practicals and project work. Practical skills are assessed through a written data analysis paper, the research project dissertation and an oral examination.

Transferable Skills:

Graduates will be able to:

- 2.12. Communicate effectively through oral presentations, computer processing and presentations, written reports and scientific publications
- 2.13. Appropriate data handling and analysis
- 2.14. Management skills: decision processes, objective criteria, problem definition, project design and evaluation, risk management, teamwork and coordination
- 2.15. Integrate and evaluate information from a variety of sources
- 2.16. Transfer techniques and solutions from one discipline to another
- 2.17. Use Information and Communications Technology
- 2.18. Manage resources and time
- 2.19. Learn independently with open-mindedness and critical enquiry

Teaching/learning methods and strategies to achieve 2.12 – 2.19:

Transferable skills are developed through the teaching and learning programme outlined above and in section 14. Skill 2.12 is taught through coursework and developed through feedback on essays, oral presentations, third week self-directed learning and the preparation of the thesis. Skill 2.13 is taught through lectures and practical work and developed, as appropriate, during individual research project. Skills 2.14-2.16 are developed through the third week self-directed learning and the research project. Skill 2.17 is developed through the third week self directed learning, other coursework activities and the research project. Skill 2.18 is developed throughout the course within a framework of deadlines and the split examination system. Although not explicitly taught, skills 2.19 is encouraged and developed throughout the course, which is structured and delivered in such a way as to promote this, in particular during the research project. Written examinations (including data analysis) are used to provide summative assessment of 2.13, 2.15 and 2.19. Examination of a thesis and the *viva* provides summative assessment of 2.12 – 2.19. Formative assessment of third week tasks provide assessment of 2.12 – 2.19.

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

MSc. Immunology Course Handbook
MSc. Immunology Standard Operating Procedure

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

Year One.

The programme is a full-time, one year course, it is not specifically divided into three terms. The course is divided into two parts: The first is a five-month taught component and the second a seven-month research project. The taught component is comprised of four specialist Immunology modules preceded by an induction and a short introductory core module. The core module is designed to give an overview of the whole subject of Immunology and related topics. Subsequent specialist Immunology modules are each three weeks long and consist of two weeks taught (with lectures and practicals) and one-week self-directed learning. In the self-directed learning, students are expected to look at a subject in depth and produce a presentation or report (such as a poster, talk, debate or journal club presentation) which is then shared with the other students on the course. Throughout the taught component, students are expected to attend the weekly external research seminars organised by the Division. The specialist modules are entitled Recognition of Antigen (structure of antigen receptors of T and B cells, MHC molecules and MHC processing); Regulation of the Immune Response (development of the immune system, the anatomy of the organs involved in the immune system and how B and T cells are regulated); Transplantation and Autoimmunity (xenotransplantation, allotransplantation, the mechanisms of T cell tolerance, systemic and organ specific autoimmune disease); Allergy, Infection and Tumour Immunology (Immunity to infectious agents, Allergic responses and the mechanisms and immunotherapy of tumours).

In February the students sit written examinations before starting the research project. The seven-month research project involves a full-time placement in a research laboratory either within the Division of Immunology and Inflammation, another Division within the Faculty of Medicine, Imperial College London or in the laboratory of honorary members of the Division, at other London based scientific institutions. Students undertake a full-time research project and after 4 to 5 months they give an oral presentation on their research progress. On completion of the project they produce a thesis and defend their work by a *viva voce* examination.

In addition to the formal teaching sessions (approximately 20 lectures per module and two days of practicals per week), students are expected to undertake private study (approximately 20-25 hours per week) to supplement the lectures and practicals and to explore areas in greater depth. During the research component students are expected to work full-time in the laboratory and to undertake private study.

Assessment

In February, at the end of the taught component there are written examinations. These consist of:

- a) Written paper 1 (3 hours; 2x 1hr essays and a critique of a published article)
- b) Written paper 2 (3 hours; 4 x short answer questions and 1 x 2hr essay)
- c) Data interpretation paper 3 (3 hours; data interpretation)

These examinations test both the breadth of knowledge of the candidate (written papers 1 & 2) and their ability to go into depth on some subjects (written paper 2) as well as their ability to understand laboratory techniques and to present and interpret data (papers 1 and 3).

In September, students are examined on their research projects. This is on the basis of their written report and *viva voce*. The *viva voce* examines both the research project and thesis and is conducted by two examiners.

In order to obtain the MSc., it is necessary to pass each Element of the course: Element 1 – written examination Papers 1 – 3, Element 2 – thesis and *viva voce* examination. Each Element is independent in that a failure in either Element requires the student to retake the failed Element, but not the Element they have passed. For each paper the pass mark is 50%. Candidates achieving an overall mark of between 50% and less than 60%, in both Elements, will be recommended for a Pass. Candidates achieving an overall mark of between 60% and less than 70%, in both Elements, will be recommended for a Pass with Merit. Candidates achieving an overall mark of 70% or greater in both Elements will be recommended for a Pass with Distinction. The overall mark is obtained with Elements 1 and 2 contributing 50% each. No mark of less than 40% will be accepted as a condoned failing mark for any component e.g. any of the written papers, thesis or *viva voce*. An overall grade of Pass, Merit or Distinction in the MSc. is awarded at the discretion of the examiners based on performance in both Elements.

In addition to the examinations, the students are assessed informally, with the marks not contributing to their final result. At the end of every module, students sit a Multiple Choice Questionnaire and they will receive feedback on the self-directed learning tasks. In addition, they write one essay per Module which is marked by their tutors.

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

- Induction programme for orientation, introduction to library and information technology, and to Immunology
- MSc. Immunology Course Handbook
- All students are allocated personal tutors whose role is to assist them with personal problems and to advise on pastoral and academic issues.
- Small tutorial groups (4-5 students : 1 staff)
- Student email and open personal access to tutorial staff including the Course Organiser.
- An MSc. course committee which includes staff and students (1 student representative/10 students on the course), which meets three times per year.
- A large community of postgraduate research students and postdoctoral research workers who work on immunology at the Hammersmith Campus.
- Library and other learning resources and facilities at the Hammersmith Campus
- Computing facilities within the Division, library and teaching area.
- Well equipped teaching and research laboratories
- Weekly seminars given by visiting speakers, weekly seminar given by member of Division, fortnightly journal club and fortnightly work in progress given by a senior member of staff.

- Students conducting their research projects at an external site are assigned a member of Imperial College London academic staff to oversee progress and advise on the preparation of the thesis.
- Access to student counsellors on the Hammersmith and South Kensington sites.
- Access to College Teaching and Learning Support Services, which provide assistance and guidance, e.g. on careers.
- Access to College English Language Support Programme
- Feedback, provided by tutors, on essays written during the taught part of the course.
- Verbal and written feedback, provided by 3rd week task chairpersons on performance in tasks; oral presentation, journal club presentation, poster presentation and debate. Written feedback is sent directly to the students by the Course Administrator.

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. Where an applicant has a lesser degree qualification but has at least three years relevant work experience after graduation, a special case for admission may be submitted to the Head of the Graduate School.

20. Processes used to select students:

All applications are reviewed by the Course Organiser and applicants are either selected for interview, for an informal visit or rejected, on the basis of their BSc. degree result, the Institution at which they studied and their references. Candidates with 2nd or 1st class degrees from a Russell Group Universities are normally made a direct offer and given the opportunity to come for an informal visit. Candidates with a lower second are usually invited to attend for interview.

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:

- Questionnaires about the classes are completed by all students after each module. These are seen and discussed by the Course Committee and Divisional Teaching Committee (See below)
- Feedback session in May, with report prepared by Course Organiser and seen and discussed by the Course Committee and the Divisional Teaching committee (See below)
- Two-three yearly review of the course by an Imperial College London academic staff member from outside the Division with a report and grading to the Graduate School of Life Sciences and Medicine, Postgraduate Quality Committee (See below)
- MSc. Immunology Course Committee, held each term, with report to Divisional Teaching Committee (See below)
- External Examiner reports (See below)

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 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.

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.

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

- MSc. Immunology Course Committee
- Board of Examiners – meets in September to consider awards
- Divisional and Departmental Teaching Committees
- Divisional Higher Degrees Committee
- Graduate School of Life Sciences and Medicine, Postgraduate Quality Committee
- Imperial College London, Quality Assurance Advisory Committee (See below)
- Imperial College London, Senate (See below)

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 disciplinarys.

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 **Graduate School Postgraduate Quality Committee** is the major vehicle for the quality assurance of postgraduate courses. Its 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.

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 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:

- Feedback is provided by tutors, on essays written during the taught part of the course.
- Feedback is provided by 3rd week task lecturers (sent directly to the students by Course Administrator), on performance in tasks; oral presentation, journal club presentation, poster presentation and debate.
- Students do Multiple Choice Questionnaire tests online and get results immediately. Results are accompanied by feedback on the nature of the students' answers e.g. incorrect answers are corrected with explanations. The Course Organiser reviews results of the tests and contacts tutors or students as appropriate, to ensure student performance is monitored and supported appropriately.
- Students complete data interpretation session following each practical class. Feedback is provided during these sessions, directly to the students, both verbally and in some instances, in a written form.
- Students are asked to report, to the student representatives, their experiences in tutorials and class. Student representatives report to the Course Committee once per term to allow the Course Organiser to act on feedback promptly.
- A feedback session in May canvasses the opinions of the current cohort of students on subjects including the provision of feedback. A report prepared by the Course Organiser, following the session, is seen and discussed by the Course Committee and the Divisional Teaching committee. Where appropriate action is taken to implement changes as soon as possible.

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 meetings with personal tutors, students are encouraged to comment about the course.
- A course questionnaire evaluation of modules, is given to each student, collected weekly, analysed at the end of each module and acted upon by the Course Organiser.
- After the examinations on the *viva voce* day, students are given the opportunity to give feedback, to the External Examiners, about the course.
- Feedback session with course organiser in May.
- MSc. Immunology Course Committee; Processes actioned as a result of student feedback are discussed at and reported to the committee.

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

- After the examinations on the *viva voce* day, students are given the opportunity to give feedback to the External Examiners, about the course.
- Feedback session with course organiser in May.
- MSc. Immunology Course Committee; student representatives report to the committee.

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:

Maintaining excellence of research projects

22. Regulation of Assessment

a) Assessment Rules and Degree Classification:

- The minimum pass mark is 50% for each module. No mark of less than 40% will be accepted as a condoned failing mark for any component e.g. one of the written papers.
- Assessment details are provided in the MSc. Immunology Course Handbook.
- To qualify for the award of MSc., students must complete all the course requirements and must achieve an overall pass mark in the written examinations that comprise Element 1 and in the coursework (thesis and *viva voce*) that comprises Element 2.
- The written examinations contribute 50% of the total marks (Papers 1; 14%, Paper 2; 14%, Paper 3; 14% Paper 4; 8%), and the thesis and *viva voce* contribute the remaining marks (equal weighting; 25% each)

The Pass Mark 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 the course modules is 50%. Students must pass both elements in order to be awarded a degree.

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 will 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; shows a high proportion find employment or further postgraduate research training in Immunology and related areas
- Independent review of the quality of the educational provision by the Quality Assurance Agency subject review process in 1998 achieving a grading of 21 out of a maximum 24 points

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

- MSc. Immunology Course Handbook
- MSc. Immunology Course syllabus; available from course administrator and available on course Blackboard pages
- MSc. Immunology website:
<http://www1.imperial.ac.uk/medicine/about/divisions/medicine/immunology/mscimmunology/>