

Programme Specification for the MSc in Epidemiology

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/publichealth/education/postgraduate/modernepidemiology/>. 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:** The course is not externally accredited.
4. **Name of Final Award:** MSc
5. **Programme Title:** MSc in Epidemiology
6. **Name of Department / Division:** School of Public Health
7. **Name of Faculty:** Faculty of Medicine
8. **UCAS Code** (or other coding system if relevant): A3BF

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

In the absence of QAA Subject Benchmarks we refer to epidemiology courses provided by UK and US Universities, the MPH at Imperial College along with current scholarship and research in epidemiology.

10. Level(s) of programme within the Framework for Higher Education Qualifications (FHEQ):
Level 7

11. Mode of Study

The programme is available full time over one year.

12. Language of Study:

English

13. Date of production / revision of this programme specification

(month/year): October 2012

14. Educational aims/objectives of the programme

The MSc offers a thorough grounding in epidemiological research and the application of statistical and mathematical methods to epidemiological investigation and practice. Students will be given the opportunity to apply research techniques to a variety of challenging epidemiological and biomedical problems.

This programme represents an opportunity for the Departments of Epidemiology and Biostatistics and Infectious Disease Epidemiology in the School of Public Health to develop the technical skills that underpin public health. The course follows a shared path with the Master of Public Health in the first term and provides a unique insight into the theory and methods developed for the epidemiological study and control of both chronic and infectious disease.

This programme aims to:

- provide graduate students from a range of backgrounds with the quantitative skills required for research in modern epidemiology.
- broaden the knowledge base of existing clinicians and scientists in related disciplines who wish to acquire and “update” their skills in the application of research methods to epidemiology and biostatistics.
- provide students with the knowledge and skills to design and conduct epidemiological studies, and to interpret, analyse and present resulting data.
- promote scientific debate and critical appraisal skills.
- promote the use of an interdisciplinary (mathematical, biological, medical and statistical) approach to the problems of communicable and non-communicable disease control.
- develop expertise in the acquisition of knowledge about biological, economic, and social factors which influence health and exposure to disease.
- offer the opportunity to develop specific interest and expertise in one of the following specialist areas: biostatistics or environmental and chronic disease epidemiology or infectious disease epidemiology.

15. Programme Learning Outcomes

By the end of the course, students will be able to:

- design, analyse, interpret and criticise epidemiological and biomedical research
- demonstrate an understanding of the essential principles of modern bio-statistical methods and how to apply them
- understand key concepts in the ecology and evolutionary biology of infectious disease
- employ basic mathematical and computational skills used in the analysis of infectious disease pathogenesis, transmission and control
- apply current research methods in key areas of their chosen specialism

15.1 Knowledge and Understanding

The students should acquire knowledge and understanding of:

1. patterns of morbidity and mortality in developed and developing countries;
2. methods used to prioritize national and international health spending;
3. the aetiology of disease;
4. concepts and methods in the ecology and evolution of pathogens;
5. patterns and methods of surveillance;
6. patterns of risk for infectious and non-infectious disease;
7. the use of clinical and intervention trials;
8. mathematical modelling techniques;
9. statistical modelling techniques;
10. information retrieval and molecular biology;
11. detailed knowledge and understanding of the essential facts, concepts and principals and theories relevant to the student’s chosen area of specialisation;
12. research, management and communications skills including problem definition, project design, teamwork, written and oral reports and scientific publications

Teaching/learning methods and strategies

Acquisition of 1 to 10 is through a combination of lectures, seminars, journal clubs and workshops. Both computer and paper based exercise are used to reinforce understanding of the concepts and techniques.

Acquisition of 11 is through a combination of lectures, seminars and workshops along with supervised study of additional literature and the generation or analysis of relevant data.

Acquisition of 12 is through workshops mini-projects and class feedback, including group solution of mathematical models and the analysis of data, oral presentations to the class by students, class lead paper reviews. A research project is used to develop and reinforce 12. Assessment of the knowledge base is through a combination of written exams and assessed coursework in the form of essays, reviews and reports on the statistical analysis of appropriate data.

15.2 Skills and other Attributes

Intellectual Skills (lateral and critical thinking, logic):

Students should be able to:

- 1- Explore evidence of causation in epidemiology.
- 2- Use an interdisciplinary (mathematical, biological, medical and behavioural) approach to problems of controlling disease applying professional judgement to the challenge of morbidity and mortality.
- 3- Collate, interrogate and synthesise data from a range of sources.
- 4- Understand probability theory and its applications in the context of disease, understand non-linear dynamics, ecological and evolutionary theory.

Teaching/learning methods and strategies

Intellectual skills are developed by a) gathering and sorting information and critically evaluating research and b) lectures reinforced by practical exercises describing and using mathematical and statistical methods.

Lectures and workshops illustrate the use of interdisciplinary methods to make judgements about disease control. These are then practiced in the mini-projects (summative assessment). Formative and summative feedback is provided on a group and individual basis on class-work, written work and oral presentations. Assessment is through unseen written exams, essays, mini-projects and the research project

Practical Skills (experimental design, data analysis, research skills):

1. analyse primary and secondary data on risk factors for disease, clinical trials data and patterns of incidence;
2. develop and analyse mathematical models describing the transmission dynamics of infectious disease;
3. calculate the costs and benefits of disease and interventions;
4. analyse demographic data;
5. carry out systematic reviews and meta-analyses;
6. where appropriate use laboratory and field based methods to generate data;
7. prepare scientific reports;
8. give technical presentations;
9. use computational tools and packages.

Teaching /learning methods and strategies

Practical skills are explained through lectures, handouts and in computer workshops. Workshops and mini-projects are used to develop an understanding of the methods and to apply them.

Skills (including the laboratory and field based collection of data if chosen as part of a research project) are further learnt during the research project.

Skills 7 and 8 are taught and developed through feedback on reports and oral presentations made as part of coursework assignments.

Skill 9 is taught through practical workshops and practical using STATA, R, Berkley-Madonna, Excel, Powerpoint, RefManager,

Practical skills are assessed through course exercises, mini-projects and the research project.

Transferable Skills (initiative, group work, independent thought etc):

1. communicate effectively through oral presentations, written reports and scientific publications;
2. apply statistical and modelling skills;
3. use computer packages and elementary programming skills;
4. management skills, decision making, objective evaluation of evidence;
5. integrate and evaluate information from a range of sources and disciplines;
6. manage resources and time;
7. learn independently with open mindedness and critical faculties.

Teaching/learning methods and strategies

Transferable skills are developed as an integral part of all teaching and learning in the programme.

Specific modules focus on the use of statistical packages and computer programming. 1 is developed through feedback. 4, 5, 6 and 7 are taught in workshops, journal clubs, mini-projects and the research project.

Skills 1 to 5 are assessed in coursework, oral presentations, mini-projects and the research project.

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

- Current scholarship in public health epidemiology, biostatistics and infectious disease epidemiology.
- Comparison with other Masters courses in Epidemiology
- Review of text book contents.
- Requirements of employers such as WHO and the HPA.
- Course proposal reviewed and approved by Senate of Imperial College.

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

Year One:

Term one:

All modules are compulsory core modules:

Induction week

10-day modules: Introduction to statistical thinking and data analysis; Principles and methods of epidemiology. Infectious Disease Modelling and Principles of Global Epidemiology.

Term two:

Core modules:

5-day modules; Advanced regression with R, Exposure assessment Molecular epidemiology, Further infectious disease epidemiology, Introduction to Bayesian analysis.

Then choose modules from these:

- Spatial Epidemiology
- Topics in Biostatistics :
- Social epidemiology
- Further chronic disease epidemiology
- Vector borne infections and helminth epidemiology
- Further infectious disease modelling
- Genetics and evolution of infectious diseases
- Investigation of outbreaks

Term three:

During term three students may chose a research project from a list of ideas that are provided by academic staff or external collaborators. Projects range from the development and analysis of a mathematical model focusing on a problem in infectious disease epidemiology, the investigation of a topic using one of the many large databases held in the teaching centre, a project that is part of a larger-scale field study, through to the synthesis and analysis of published data, either in a meta-

analysis or health economic analysis or the laboratory investigation of epidemiological samples as part of larger scale laboratory programmes or projects.

Projects may, or may not be, chosen to fit with a specialism pathway (some students may decide not to specialise in one particular subject area as given above).

It is possible that the projects will be carried out in collaboration with external companies or government agencies.

Projects are expected to take 18 weeks, with a member of Imperial College academic staff assigned to advise and monitor students. Project assessment is based on a written dissertation. All students have a viva on their project and other aspects of the course with the External Examiner.

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

All students receive a comprehensive induction week programme which provides a general overview of the course itself and the facilities that Imperial has as a whole. During the induction week students will meet the appropriate members of staff, will have a health and safety talk, receive tours of the building and facilities, IT induction and have an administrative session. During this administrative session all coursework and exam deadlines will be explained to the students. They will also be provided with a personal tutor, who would have been specifically selected by the Course Director or Course Organiser, depending on the students individual skills and interests. Students are strongly encouraged to make an appointment and meet with their tutors during the first week. Students will have access to libraries at St Mary's campus, Charing Cross and South Kensington. Students have a dedicated teaching/computer room at St Mary's (their main campus) and have a student common room which is shared with medical students. Early on in the course students are asked to submit an essay which is assessed by the course tutors and any English Language problems can be picked up at an early stage. If required students are asked to attend the English Language support service provided at the South Kensington campus. The students elect a student representative who reports any problems/information to the MSc/MPH Course Committee. Additionally, students are required to complete module evaluation questionnaires on a regular basis. These are reviewed by the Course Committee as well. Feedback from both methods is taken very seriously and the Course Committee makes changes based on these comments. Any changes made are reported back to the student representatives.

19. Criteria for admission:

Upper second class honours degree or overseas equivalent. Suitable candidates will have a background in mathematics or statistics, medicine (human and veterinary) or biological sciences. In addition to recent graduates in the above subjects, mature applicants with relevant academic or professional experience and proven numeracy skills will be considered. All students whose native language is not English must have passed an English examination as directed by the School with an overall IELTS score of 7 or equivalent.

20. Processes used to select students:

The Course Director or Course Organiser is responsible for dealing with applications. They will assess applications, including the personal statement, references and any previous applications to determine the suitability of the applicant for the course.

Any studentships are allocated annually through a special meeting of the MSc/MPH Course 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 the Board 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 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.

This is overseen by the Taught Courses Committee which is attended by all stream leaders and administrators involved in the course. As part of this meeting student evaluations and feedback is discussed on a regular basis and amendments to courses are made if appropriate. Examinations and assessments are also discussed during these meetings to ensure that it is of an appropriate level and fits well into the curriculum. There is a separately constituted examination board which works with the Taught Courses Committee in developing and assessing the elements of assessment.

The methods to review teaching include:

Module reviews based on feedback in weekly surveys and evaluation of learning in examinations and coursework.

Annual course review prepared by the course director and the course committee.

Once every two years a review of the course by the Graduate School of Life Sciences and Medicine Education Quality Committee. This includes an external review of the course quality and performance.

Peer teaching observations.

External examiners' 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:

The MSc/MPH Course Committee provides prompt feedback to students on all aspects of the course and regularly discusses ways in which processes can be improved. We currently ask all markers to provide written feedback on all coursework elements of the course which we filter down to students as soon as possible after the appropriate examination board. With examinations and other summative assessment the Course Director/Course Organiser meets each student individually after the examination board to give students their band mark and to discuss any queries the students may have. Monitoring of these processes is undertaken by the MSc/MPH Courses Committee.

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:

Students are asked to complete online surveys at the end of each day which asks questions about each session that day. Questions are asked about the lecture, quality of material, administration, length of session and are rated on a scale. There is also a section where students can write any additional comments. These responses, and comments, are collated by the teaching administrators and results are given in general to the MSc/MPH Course Committee, in particular to each lecturer and the stream/module leader. Changes can then be made on specific elements of the course as required. We also have a student representative who provides feedback from the whole student cohort to the committee. Any changes made will be disseminated to the student representative who will tell all other students.

In addition we use

- Meetings with personal tutors.
- Course questionnaire evaluation.
- Viva with external examiner.

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

Tutors are assigned and contacts encouraged. The course organisers and director are also available to meet students and solicit feedback on personal tutors.

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 the 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 programmes in public health epidemiology, biostatistics and infectious disease epidemiology to remain up to date with the field
- Teaching performance and development is reviewed in an annual personal review and development meeting.
- Continuing professional development courses are available to staff
- New lecturers are required to undergo training.

22. Regulation of Assessment

a) Assessment Rules and Degree Classification:

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.

1. The first term of the course is assessed in January by one 3-hour written examination paper under formal exam conditions and one mini-project of 4,000 words.
2. The second term is assessed in April/May by one 3-hour written examination paper and one mini-project. Mini-projects are submitted one week after the Easter recess. Each exam contributes 15% to the final assessment. Each mini-project contributes 15% to the final assessment. Projects typically assess skills in mathematical modelling with the development and solution of a model of the transmission dynamics of an infection and the statistical analysis of a dataset. The students are required to give an oral presentation in the third term based around one of their mini-projects. Students are required to demonstrate competence in the use of appropriate statistical methods and software, in oral and written presentation of their work, and the ability to critically appraise and interpret the research of themselves and others.
3. The third term is assessed on the basis of a dissertation describing project work of maximum length 10,000 words. Two assessors will grade the 4-month individual research project on the basis of this dissertation, which will contribute 35% of the final mark. The project submission date is the first Monday in September. Later, in September, after the written project has been marked the student presents the work in an oral examination and is questioned by the External Examiner.

b) Marking Schemes for postgraduate taught programmes:

The Pass Mark for all **postgraduate** taught course modules 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,

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:

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

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

<http://www.imperial.ac.uk/medicine/study/postgraduate/masters-programmes/msc-epidemiology/>