Programme Specification: MSc and Diploma in Applied Statistics

1. Awarding institution/body
   University of Oxford

2. Teaching institution
   University of Oxford

3. Programme accredited by
   n/a

4. Final award
   (a) MSc in Applied Statistics
   (b) Diploma in Applied Statistics

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   (a) MSc in Applied Statistics
   (b) Diploma in Applied Statistics

6. UCAS code
   n/a

7. Relevant subject benchmark statement
   Mathematics, Statistics and Operational Research

8. Date of programme specification
   September 2014

9. Educational aims of the programme

   The aims of the programme are that students:

   • learn a wide range of statistical methods, especially modern, computer-intensive methods;

   • gain extensive hands-on experience of the analysis of real data from a wide variety of fields;

   • develop the skills to interpret and communicate their results.

10. Programme outcomes and means by which they are achieved

    Lectures

    • Lectures provide information for students to gain a full understanding of the general theory and practice of statistical analysis at an advanced level appropriate for MSc study.

    • Lectures are provided on core topics which cover some of the fundamentals of statistics, statistical theory, a wide range of statistical methods, R programming; core material also covers modern computational aspects of statistics through lectures on a range of further statistical methods and statistical data mining and machine learning.

    • A menu of optional topics is provided on further statistical methodology and applications including for example courses in survival analysis, statistical genetics, advanced simulation methods and actuarial science.
• Non-examinable skills support lectures are provided on report writing and LaTeX document production.

Guided reading

• Recommended reading is provided for all modules of the course in advance in a student handbook.

Course assignments and example classes

• Assignments are provided to further understanding and extend knowledge in modules, together with example classes covering problem solving.

Practical Sessions

• Practical sessions enable students to undertake practical statistical data analysis that complement lectures.

• They enable students to learn statistical computing skills using modern statistical software such as R.

• They also enable students to learn to write a report on the statistical analysis of data.

Dissertation (MSc, but not Diploma students)

• Working on a dissertation enables students to undertake an in-depth study of a statistical problem involving modelling, computing and data analysis; almost all dissertations contain an account of the analysis of some body of real data.

• It enables students to learn to undertake directed research, report writing, presentation and communication of research results.

Seminar series

• The department has a weekly seminar series with external invited speakers which students are encouraged to attend to learn about current research in statistics. In addition there are many specialist seminar series that students may attend, according to their interests.

11. Programme Structures and Features

The MSc/Diploma in Applied Statistics programme is designed mainly as postgraduate training for those intending to apply statistics in areas such as scientific research, industry and administration.

The MSc is a 12-month programme running from October to September. It covers a wide range of statistical methods, and gives extensive hands-on experience of the analysis of real data from a
wide variety of settings. Throughout the emphasis is on statistics as an applied subject, and a particular focus is the use of modern, computationally intensive methods.

The 9-month Diploma programme, running from October to June, is intended for students with a more practical background. There is no dissertation and greater weight is given to the basic parts of the course than in the case of the MSc.

Both MSc and Diploma students attend a comprehensive set of lectures, practical classes and supervision meetings.

Lecture courses

Coursework is divided into core and optional topics. Core topics cover some of the fundamentals of statistics. There is a menu of optional topics on further statistical methodology and applications.

There are two 3-hour examination papers.

Paper I: Principles of Statistical Analysis

This consists of compulsory questions on the core subjects:

- Statistical Methods
- Statistical Theory
- R Programming

Paper II: Further Statistical Methodology

This consists of full questions and half-questions on core and optional material: students are expected to answer the equivalent of five full questions including the equivalent of at least two full questions on the core topics.

Core Topics

- Further Statistical Methods
- Statistical Data Mining and Machine Learning

Optional Topics

- Survival Analysis
- Stochastic Models in Mathematical Genetics
- Actuarial Science
- Advanced Simulation Methods

Practical Sessions

There are compulsory practical sessions each week in Michaelmas and Hilary Terms which students attend. Two practical sessions in each term are assessed. Students write reports on their analysis of statistical problems which are marked and feedback is communicated to students via their supervisor. There is also a week-long practical assessment in Trinity Term where an assignment involving the analysis of several datasets is completed for assessment.
The distinction between the MSc course and the Diploma course is that the Diploma course ends after the examination in June, whereas the MSc course involves in addition a project during the summer and submission of a substantial dissertation by the middle of September.

Dissertation

MSc students are required to submit a dissertation on some topic with an agreed supervisor and approved by the MSc Supervisory Committee.

The dissertation is expected to include evidence that the candidate is capable of applying statistical methods, operational research methods, or stochastic modelling to realistic problems. Most dissertations will therefore contain an account of the analysis of some body of real data, and this work constitutes the summer project.

12. Support for Students and their learning

- All students are assigned a supervisor for the duration of the course. In practice the supervisor of a student’s project/dissertation will not usually be the supervisor of their course work, a student’s supervisor will usually change for the project/dissertation. Students will usually meet their supervisors regularly throughout the course of the year to discuss their progress, and in particular for the supervisor to advise on the project/dissertation.

- There is a Course Coordinator who makes the everyday arrangements for the course and who is in regular contact with students about course matters and arrangements. The Chairman of MSc Supervisory Committee, Director of Graduate Studies, Director of Studies and Academic Administrator are able to provide further guidance and support.

- There is a Course Handbook issued every year. This contains full synopses for the courses offered, reading lists, and general guidance and information about the MSc and the Department. Course material for students is available on the web.

- Lecture courses are supported by problem sheets and classes, and practical classes.

- The Department has a library. Students also have access to the Radcliffe Science Library, and there is a library in each student’s college.

- Students have access to the computing labs in the Department. The principal computing resource for the MSc is the main lab, which is principally for MSc student use.

- Facilities for language development are available through the University’s Language Centre.

- Within college each student will have an advisor and there will be a Tutor for Graduates and a Senior Tutor. Each college has an extensive support structure of advisors, welfare officers and peer support groups, and the University counselling service offers a range of assistance to students.
13. Criteria for Admission

A full statement of Selection Criteria can be found at http://www.ox.ac.uk/admissions/graduate/courses/msc-applied-statistics

14. Methods for evaluating and improving the quality and standards of learning

The programme is set and administered by a Supervisory Committee. Students are in regular contact with the Course Coordinator who makes the everyday arrangements for the course, and also have access to the Chairman of the Supervisory Committee, Director of Graduate Studies and Director of Studies.

Students elect the MSc representative on the Department’s Graduate Liaison Committee, which meets termly and at which student concerns are discussed, in addition to student feedback being sought via termly questionnaires.

Responsibility for the course is vested in the Mathematical, Physical and Life Sciences Division. The Divisional Board has formal responsibility for the maintenance of educational quality and standards in the broad subject areas, and exercises its responsibility through its Academic Committee, and in particular the scrutiny it gives to the new course proposals and proposed course revisions, to reports of examiners, and to more general questions of academic policy.

The Division carries out reviews of the course. Changes in regulations require Divisional and Education Committee approval. The Divisional Board is also responsible for academic appointments and for the arrangements (including mentoring, appraisal, and reviews of performance) for the support of newly appointed lecturers and for monitoring their teaching competence.

15. Regulation of assessment

Assessment regulations are provided to students at the beginning of the course in the Course Handbook.

For MSc candidates the overall assessment is based on four parts:

- Paper I: Principles of Statistical Analysis
- Paper II: Further Statistical Methodology
- Assessed Practical Work
- Dissertation

Each of these parts has equal weight and contributes 25% to the overall total mark. Candidates can pass, pass with distinction, or fail. The overall pass mark is 50%. An overall average of at least 70% is required for a distinction together with a mark of at least 65% in the dissertation. Candidates who have initially obtained a mark of less than 50% on any of the four parts shall not normally be eligible for the award of distinction.
Diploma students take only the written examination papers and the assessed practical work. The corresponding weights for each part of the course are 37.5%, 25% and 37.5% respectively.

Papers I and II are 3-hour examination papers. Generally one examination question is set per 8-10 hour lecture course but a question is also normally set when a course has 6 hours of lectures.

Four computer-based assessed practical assignments are carried out in Michaelmas and Hilary terms. These are normally based on exercises done in the weekly practical classes. There is also a week-long practical assessment in Trinity Term.

The shorter practical assignments contribute 50% and the week-long practical 50% to the overall practical mark.

MSc students must submit a dissertation of no more than 12,000 words. The dissertation project is carried out over the summer period, from the last written examination to the dissertation submission date on the second Monday in September.

The qualitative descriptors levels of performance are, in summary:

**Distinction:** The candidate shows excellent skills in modelling, reasoning and problem-solving. He/she demonstrates an excellent knowledge of the material, and is able to use it innovatively in unfamiliar contexts. The candidate has also shown the ability to tackle a large piece of applied statistics and write it up clearly and effectively.

**Pass:** The candidate shows good or very good skills in modelling, reasoning and problem-solving. He/she demonstrates a good or very good knowledge of much of the material. The candidate has also shown the ability to tackle a large piece of applied statistics and write it up effectively.

**Fail:** The examiners consider that the candidate is not worthy of an MSc/Diploma. There is little evidence of competence in the topics examined; the work is likely to show major misunderstanding and confusion or seriously inaccurate calculations. The candidate either leaves without a degree or may retake the examination the following year.

(If a candidate fails the MSc but nevertheless shows sufficient merit to pass the Diploma, the candidate has the option of retaking the examination the following year or of being issued with a diploma.)

**16. Indicators of quality and standards**

The following indications have broadly confirmed that the standard of awards is appropriate, and the quality of teaching and research is high.

- Institutional Audit 2009.
- The reports of External Examiners regularly address issues of quality and standards.
• The External Advisory Panel of the Department of Statistics includes representatives of a number of potential employers of graduates from the programme. It meets annually with members of the Department, including members of the MSc Supervisory Committee, and is consulted and kept informed about the content of the course.