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MSc/ DIPLOMA IN APPLIED STATISTICS 2014/2015

We welcome you to the Department of Statistics and our MSc programme in Applied Statistics. The programme is demanding, but we are here to help and want to see you succeed. All the best for your academic year 2014-2015.

Geoff Nicholls (Head of Department)

1. Introduction

Overview

The Master of Science by Coursework in Applied Statistics 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 in Applied Statistics 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, example and practical classes and supervision meetings held in the Department of Statistics.

The initial registration for the MSc or Diploma may be changed either way up to the last day of Hilary Term, subject to approval by the Director of Graduate Studies.

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.

Structure of Assessment

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

- Written Examination Paper I Principles of Statistical Analysis
- Written Examination Paper II Further Statistical Methodology
- Assessed Practical Work
- Dissertation.

For Diploma students the overall assessment is based on three parts:

- Written Examination Paper I Principles of Statistical Analysis
- Written Examination Paper II Further Statistical Methodology
- Assessed Practical Work
For both the MSc and the Diploma, candidates can pass, pass with distinction, or fail.

**Written Examination Paper (i) Principles of Statistical Analysis**  
JAST 7120

This examination paper consists of compulsory questions taken from the core subject areas:

- Statistical Methods
- Statistical Theory
- R Programming

**Written Examination Paper (ii) Further Statistical Methodology**  
JAST 7121

This examination paper consists of questions taken from the core subject areas:

- Further Statistical Methods
- Statistical Data Mining and Machine Learning

and also from the optional subjects:

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

**Assessed Practical Work**

There will be a number of assessed computer-based practical assignments in Michaelmas Term and Hilary Term. Group working will be introduced in non-assessed situations in Michaelmas Term and one practical will be assessed by group work in Hilary Term, following a mock group assessed practical at the beginning of the term.

There is also a week-long practical assessment in Trinity Term.

**Dissertation**

MSc students must submit a dissertation of no more than 12,000 words. The dissertation project is mainly carried out over the summer period from late May to the dissertation submission date which noon on the second Monday in September (14 September in 2015) but students will need to do preparatory work in the Spring.

**Collection**

A ‘collection’ – a test on topics studied in Michaelmas Term – will take place in the Department in week 0 Hilary Term (week 11-17 January 2015). This does not form part of the final assessment for the course.

**Programme specification**

The programme specification for the MSc in Applied Statistics can be found at [http://www.stats.ox.ac.uk/current_students/msc_and_diploma_in_applied_statistics](http://www.stats.ox.ac.uk/current_students/msc_and_diploma_in_applied_statistics).
2. Course Information

Term Dates and residence requirements

Lecturing is concentrated in three eight-week terms (weeks 1-8):

MICHAELMAS TERM
Sunday 12 October 2014 to Saturday 6 December 2014

HILARY TERM
Sunday 18 January 2015 to Saturday 14 March 2015

TRINITY TERM
Sunday 26 April 2015 to Saturday 20 June 2015.

Lectures and classes are often arranged in Week 9 of Michaelmas and Hilary Terms (7-13 December and 15-21 March) and the deadline for submission of assessed work may be in Week 9. There will also be a test in week 0 of Hilary Term (11-17 January) whose test results do not count towards the final degree mark but are to help students and their supervisors assess progress. You are therefore expected to remain in Oxford at these times. After the end of Trinity Term, MSc students should remain in Oxford throughout the summer to continue work on their project although a holiday may be taken during this period.

There are minimum residence requirements for the degree. Students must have lived in college-approved accommodation within the University for at least six weeks for three terms and having paid the appropriate fees. If you are unable to keep the required number of terms because of illness or other reasonable cause, the University Proctors may excuse you from part of statutable residence. Students living out of college must reside within 25 miles of Carfax in the centre of Oxford.

Dispensation from the residence limits will only be granted by the Proctors in exceptional circumstances. Applications need to be made through your College Office. If you live outside the residence limits without permission, you will not fulfil the statutory requirements and may not be allowed to enter for examinations.

Course contacts

Dr Marco Scutari is currently the MSc Course Coordinator and makes the day-to-day arrangements for the course. There is also a formally constituted MSc Supervisory Committee.

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSc Course Coordinator</td>
<td>Dr Marco Scutari</td>
<td><a href="mailto:msc-coord@stats.ox.ac.uk">msc-coord@stats.ox.ac.uk</a></td>
</tr>
<tr>
<td>Head of Department of Statistics</td>
<td>Dr Geoff Nicholls</td>
<td><a href="mailto:nicholls@stats.ox.ac.uk">nicholls@stats.ox.ac.uk</a></td>
</tr>
<tr>
<td>Chair of MSc Supervisory Committee</td>
<td>Dr Geoff Nicholls</td>
<td><a href="mailto:nicholls@stats.ox.ac.uk">nicholls@stats.ox.ac.uk</a></td>
</tr>
<tr>
<td>Director of Graduate Studies (MT &amp; HT)</td>
<td>Professor Gesine Reinert</td>
<td><a href="mailto:reinert@stats.ox.ac.uk">reinert@stats.ox.ac.uk</a></td>
</tr>
<tr>
<td>Director of Graduate Studies (TT)</td>
<td>Professor Colin McDiarmid</td>
<td><a href="mailto:cmcd@stats.ox.ac.uk">cmcd@stats.ox.ac.uk</a></td>
</tr>
<tr>
<td>Deputy Director of Graduate Studies</td>
<td>Dr Sarah Filippi</td>
<td><a href="mailto:filippi@stats.ox.ac.uk">filippi@stats.ox.ac.uk</a></td>
</tr>
<tr>
<td>(student liaison)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deputy Director of Graduate Studies</td>
<td>Dr Geoff Nicholls</td>
<td><a href="mailto:nicholls@stats.ox.ac.uk">nicholls@stats.ox.ac.uk</a></td>
</tr>
<tr>
<td>(training)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Director of Studies</td>
<td>Dr Neil Laws</td>
<td><a href="mailto:laws@stats.ox.ac.uk">laws@stats.ox.ac.uk</a></td>
</tr>
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</table>
Lecture courses

Lectures for the MSc/Diploma in Applied Statistics are shown on timetables, available via WebLearn https://weblearn.ox.ac.uk/portal, at the beginning of each term. Students should discuss with their departmental supervisor which optional lectures to attend. Students are expected to complement the contents of lecture courses by further independent reading from books suggested by lecturers or supervisors.

Lectures are normally given in the Lecture Room in the Department of Statistics, 1 South Parks Road. Some lectures are shared with other courses and may be held in other University buildings, especially the Andrew Wiles Building of the Mathematical Institute. A map can be found at http://www.ox.ac.uk/visitors/maps-and-directions/departments.

Problem sheets are provided on the core topics and some of the options, and classes arranged to discuss the problems. Receiving comments from the tutor and marker about submitted problem sheets is one of the main sources of feedback to students about their work. Students are therefore strongly encouraged to submit the problem sheets and attend classes.

Mobile phones should be turned off when entering the Lecture Room. Food and drink may not be taken into the Lecture room.

Lecture Courses by Term

<table>
<thead>
<tr>
<th>Michaelmas</th>
<th>Hilary</th>
<th>Trinity (Weeks 1-4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paper I</strong></td>
<td>Statistical Methods</td>
<td>Statistical Methods</td>
</tr>
<tr>
<td></td>
<td>Statistical Theory</td>
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<td></td>
<td>R Programming</td>
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<tr>
<td><strong>Paper II core</strong></td>
<td>Further Statistical Methods</td>
<td>Statistical Data Mining and Machine Learning</td>
</tr>
<tr>
<td><strong>Paper II optional</strong></td>
<td><strong>Actuarial Science I</strong></td>
<td>Actuarial Science II</td>
</tr>
<tr>
<td></td>
<td><em>(background only)</em></td>
<td>Advanced Simulation</td>
</tr>
<tr>
<td></td>
<td>Stochastic Models in</td>
<td>Methods</td>
</tr>
<tr>
<td></td>
<td>Mathematical Genetics</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Survival Analysis</td>
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<tr>
<td><strong>Skills</strong></td>
<td>Introduction to LaTeX</td>
<td>Dissertation Preparation</td>
</tr>
<tr>
<td></td>
<td>Report Writing</td>
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</table>
Course material and timetables

Timetables, announcements, course documents and links to the course material are found on the MSc in Applied Statistics section of the University’s WebLearn system using the login at https://weblearn.ox.ac.uk/portal or via the link at http://www.stats.ox.ac.uk/current_students/msc_and_diploma_in_applied_statistics.

General University information for students can be found via the University’s Student Gateway at http://www.ox.ac.uk/current_students/index.html

Noticeboard

The graduate student noticeboard can be found near the common room in 1 South Parks Road.
Lecture Synopses

Examination Paper I  

Principles of Statistical Analysis

Statistical Methods (24 hrs)

- Visualization (3): plots, including multivariate plots, mosaic plots. Use of density estimation and smoothing functions.
- Linear Models (6): linear and multiple linear regression. Model selection, model checking, regression diagnostics and resistant regression. Classical applications to ANOVA.
- Autocorrelation (4): ideas, ARIMA models, methods needed for MCMC output analysis (MCMC covered later).
- Hierarchical models (4): frequentist and Bayesian approaches.
- Logistic and Log-linear models (4): Both classical and Bayesian approaches.

Relevant books will be recommended by the lecturers but include:

Statistical Theory (16 hrs)

- Introduction: statistical inference, statistics and probability, some typical problems (estimation, hypothesis testing, prediction).
- Likelihood: likelihood and profile likelihood, sufficient statistics, exponential families.
- Point estimation: estimates and estimators, bias, method of moments, estimating equations, maximum likelihood estimates, Fisher information, efficiency.
- Hypothesis Testing: significance tests, test statistic, level of significance, power of a test, likelihood ratio test and tests related to the likelihood, Neyman-Pearson Lemma, multiple testing.
- Interval estimation: confidence regions (pivotal quantities, general procedure), prediction regions, introduction to bootstrap and bootstrap confidence intervals.
- Asymptotic theory: properties of maximum likelihood estimator, properties of likelihood ratio tests, approximate methods for confidence regions.
- Bayesian Inference: Bayesian method (frequentist-, objective-, personalistic-Bayes), priors (flat, improper, informative, non-informative, conjugate), Bayes factors, credibility regions and highest posterior density regions, prediction.
Relevant books

Further Reading

R programming (8 hrs lectures plus 8 practical sessions)
The practical sessions take place in the lecture room in 1 SPR. Students are asked to bring their charged laptop with them. There are no sockets available in the lecture room.

- Installation and basic use of R.
- Representation of numbers in computers, representation and rounding errors.
- Functions, loops, and vectorization.
- Input and output of data.
- Graphics and data visualization with R.
- Simulation and numerical methods, including optimization.
- Debugging and tuning R functions, compiling R code.
- Calling external code.

Main Books

Other Books
Examination Paper II  

Further Statistical Methodology

Core Topics

Further Statistical Methods (18 hrs)

- Further time series (4): Spectral analysis, state-space models.
- Contingency tables (3): Proportional-odds logistic regression, graphical models, special methods (for example for symmetric tables).
- Monte Carlo Methods (8): introduction and ideas, Gibbs sampler, Metropolis-Hasting schemes, output analysis, slice sampler. Example applications in a Bayesian setting.
- Non-linear models (3): Non-linear regression, additive and generalized additive models.

Relevant books will be recommended by the lecturers but include:

Statistical Data Mining and Machine Learning (16 hrs)

- Fundamentals of machine learning and data mining:
  Statistical learning theory, bias/variance tradeoff, generalization and overfitting, regularization, decision theory.
  Evaluating learning methods with training/test sets and cross-validation.

- Unsupervised learning:
  Dimension reduction and visualization: principal components analysis, biplots.
  Clustering: mixture models, K-means, hierarchical clustering.
  Probabilistic latent variable models and the EM algorithm.

- Supervised learning:
  Generative methods: naive Bayes, linear discriminant analysis.
  Discriminative methods: K-nearest neighbours, logistic regression, neural networks, support vector machines and the kernel trick, decision trees.
  Ensemble methods: bagging, boosting, random forests.

Relevant Reading

Further Reading
Optional Courses

Survival Analysis (6 hrs)

- Survivor and hazard functions; censoring. Nonparametric analysis; life tables; product-limit estimator; Greenwood’s formula; actuarial estimator. Parametric models, medical and industrial applications.
- Parametric analysis for a single sample.
- Regression models for data in continuous time; accelerated life; proportional hazards; model fitting and checking. Partial likelihood. Log-rank tests.

Relevant books

Stochastic Models in Mathematical Genetics (8 hrs)

- Evolutionary models in Mathematical Genetics
- The Coalescent process describing the stochastic behaviour of the ancestral tree of a collection of genes. Mutations on ancestral lineages in a coalescent tree. Inferring the time to the most recent common ancestor in a sample of genes from the number of mutations occurring to the genes. Models with a variable population size.
- The frequency spectrum and age of a mutation. Ewens' sampling formula for the probability distribution of the allele configuration of genes in a sample in the infinitely-many-alleles model. Hoppe's urn model for the infinitely-many-alleles model.

Relevant books
**Actuarial Science (16 hrs)**

For the first 6-8 lectures of this option, the material in the first 4-6 lectures of the undergraduate SB4a Actuarial Science I course run in Michaelmas Term is needed as background. MSc students who do not already have this background are advised to attend these lectures. MSc students are welcome to attend all 16 of the SB4a lectures. Please note however that the examinable syllabus for the MSc is as below - it corresponds to the syllabus of the undergraduate SB4b Actuarial Science II course, lectured in Hilary Term.

[6-8 lectures]
- Price and value of forward contracts. Term structure of interest rates, spot rates, forward rates and yield curves. Duration, convexity and immunisation.

[8-10 lectures]
- Theories of value, St Petersburg Paradox, statement of Expected Utility Theory (EUT) and Subjective Expected Utility (SEU) representation theorems
- Risk aversion, the Arrow-Pratt approximation, comparative risk aversion, classical utility functions.
- First and second order stochastic dominance, the Rothschild-Stiglitz Proposition.
- EUT justification for insurance, Mossin's Theorem, Arrow's Theorem on the optimality of deductibles, static portfolio choice.
- Desynchronisation and financial systems, Static exchange economy and Pareto efficiency, the mutuality principle, efficient allocation of aggregate risk.

**Relevant books and papers:**
Subject 102 [CT1] Financial Mathematics Core Reading Faculty & Institute of Actuaries.

**Advanced Simulation Methods (16 hrs)**

MSc students should be aware that this course is a mathematically sophisticated treatment of simulation methods. While this treatment should be interesting for MSc students with strong mathematical backgrounds, it may not be suitable for others.

This course concentrates on Markov chain Monte Carlo (MCMC) methods and Sequential Monte Carlo (SMC) methods. Examples of applications of these methods to complex inference problems will be given.

**Synopsis**
- Classical methods: inversion, rejection, composition.
- Importance sampling.

- Advanced MCMC methods: Gibbs sampling, slice sampling, tempering/annealing, reversible jump MCMC. pseudo-marginal MCMC.
- Sequential importance sampling.
- SMC methods: nonlinear filtering.

Reading
C.P. Robert and G. Casella, Monte Carlo Statistical Methods, Springer-Verlag.

Further reading

Non-examined Material
There are a number of courses which will not be formally examined.

Introduction to Operational Research

Statistical Computing
Introduction to LaTeX.

Report writing

Dissertation preparation
Links to further sources of skills and study resources can be found on the website at http://www.ox.ac.uk/students/academic/guidance/skills.

All Masters within the MPLS Division automatically become a member of the Mathematical, Physical and Life Sciences (MPLS) Division Graduate School when they register for a postgraduate level qualification here. Through the Graduate School students can view and book training provided by all MPLS departments as well as the Division, Bodleian Libraries, Careers Service, IT Services and Language Centre.

http://www.mpls.ox.ac.uk/learning/graduate-school

Research-Teaching Nexus
The Department of Statistics has an international reputation for its research profile. The University of Oxford believes that there are many benefits to the teaching of its courses that are a consequence of this high level of research activity. The tutors and lecturers with whom you will interact during this course are not only employed to teach you, but are also, in many cases, actively engaged in one or more of the wide range of research projects that contribute to the Department’s research reputation. Many of the individual academic staff in this Department are recognised internationally as leaders in their own field of specialisation.
The impact of research on teaching in this department may take many forms: tutors and lecturers include their own date or ideas from research in their teaching; the regular updating of reading lists and curricula to reflect research developments; the development of research skills and research-based approaches to study through participation in the MSc research project; access to research seminars; opportunities to meet with research students and members of the faculty, particularly at the research project stage; experience of preparing research reports for external publication in some cases. In general you will be encouraged to develop the ability to interpret and critically appraise new data and to critically appraise research literature.

Seminars

The Department of Statistics organises seminars in statistics on Thursdays during term at 2:15 p.m. These are held at 1 South Parks Road. Many speakers are distinguished researchers from Oxford and beyond. The seminars provide a useful opportunity to hear about current research problems in statistical theory and applications. Those attending normally continue discussion over tea and biscuits afterwards. Further information can be found at http://www.stats.ox.ac.uk/events/

Students are also welcome to attend the Graduate Lectures at 3.45 pm on Thursdays.

Other seminar series may be of interest to particular students. Supervisors will be able to offer advice.

General Books

We recommend that you purchase the following book for the course:


You may also wish to own some of the following books for further study. This is in addition to any books recommended for a particular course.

A First Course in Probability, Sheldon Ross, Pearson Higher Education, 2005
- Simple basic book giving introduction to probability

Probability and Random Processes, Geoffrey Grimmett and David Stirzaker, OUP, 2001
- More in depth presentation of probability theory

- Covers both probability and statistics

The Statistical Sleuth, Fred L Ramsay and Dan Schafer - Textbook with lots of worked examples of how to apply statistics in practice

Mathematical methods for Science Students (Stephenson)
- General mathematics

**Practical Classes and Assessment**

There are weekly practical classes on Friday afternoons at 2pm or 4 pm depending on which group students are assigned to. Group A will have classes at 2 pm in Michaelmas Term and 4 pm in Hilary Term and vice versa for Group B. The practical classes are compulsory and all students must attend them. They take place in the MSc Computing Laboratory in 1 South Parks Road.

Most classes will use R. Students are recommended to buy a copy of the book *Modern Applied Statistics with S* by W N Venables and B D Ripley, Springer, (2002), which is used extensively throughout the course.

The practical assessment is made up of a major week-long assignment in Trinity Term and the assessment of specific pieces of coursework in Michaelmas and Hilary Terms. The assignments in Michaelmas and Hilary Terms are normally based on exercises done in the weekly practical classes. The assignments are submitted in the Department on the Monday morning by 10 am, following the Friday practical class. The week-long practical assessment in Trinity Term took place in from Monday week 1 to Monday week 2 in 2014. The assessment comprises a number of exercises involving the analysis of datasets. A complete report is required at the end of the week. For each practical report that you submit, you should include the R code that you used as an appendix to your report.

Group working will be introduced in non-assessed situations in Michaelmas Term and there will be one practical assessed by group work in Hilary Term. A mock group assessed practical will be held at the beginning of Hilary Term. An individual mock practical is held at the beginning of Michaelmas Term. You will receive feedback on these mock practicals before undertaking assessed practicals of a similar type. You will also receive feedback on assessed practicals, using a form similar to that on the following page.

For the group work assessed practical, students will be allowed to choose their own groups of around 4 people. Because students will form their own groups, in exceptional circumstances smaller groups will be allowed. Each group is expected to submit a group report and each student in the group will receive the same mark for the group report.

Declaration of authorship forms must be completed for each piece of coursework submitted. The relevant form will be available on the WebLearn site. Students should pay particular attention to the University’s policies on plagiarism including collusion [http://www.ox.ac.uk/students/academic/guidance-skills/plagiarism/](http://www.ox.ac.uk/students/academic/guidance-skills/plagiarism/). All assessed practicals must be submitted to the Receptionist in 1 South Parks Road. Practicals will be blind marked and students will be issued with a practical identification number to use on their reports instead of names.

Interim marks given for the practical assignments in Michaelmas and Hilary terms are provisional and may be subject to further moderation. The assessed practicals contribute 25% to the overall mark for the MSc and 37.5% for the Diploma.

Further information on writing up practicals and the marking guidelines can be found on the course Weblearn site.

A smaller Computing Laboratory, with 10 computers, is available in room 2.201 in 2 South Parks Road.
Student Name: 
Practical Title: 

[Tick one box for each of 1-6. The middle box corresponds to satisfactory work (and boxes to the right/left indicate stronger/weaker work).]

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<table>
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</thead>
<tbody>
<tr>
<td>1. Writing Style</td>
<td>Unclear, difficult to read</td>
<td>Clear, flowing, easy to read</td>
</tr>
<tr>
<td>2. Statistical Analysis</td>
<td>Weak, invalid</td>
<td>Strong, valid</td>
</tr>
<tr>
<td>3. Answering the report question</td>
<td>Aspects of the question ignored</td>
<td>Question answered in full</td>
</tr>
<tr>
<td>4. Conclusions</td>
<td>No observations</td>
<td>Limitations of current analysis clearly brought out</td>
</tr>
<tr>
<td>5. Figures and Tables</td>
<td>No statistical meaning, wrong size, missing labels or captions</td>
<td>Meaningful, correct size, good labels and captions</td>
</tr>
<tr>
<td>6. R Code</td>
<td>Missing R code, inconsistencies</td>
<td>Well presented and correct R code</td>
</tr>
</tbody>
</table>

Overall Assessment: 

[This indication is provisional and may be reviewed and amended by the Examiners.]

Individual Feedback:
**Supervision**

Each student is allocated a supervisor. Your supervisor will arrange regular meetings with you throughout the course of the year to discuss your progress. These meetings should be held about four times a term but this will vary depending on the amount of work needing to be covered. Each student should see his or her supervisor at the beginning of each term to arrange convenient times. It is very important to keep appointments wherever possible, and if not to let your supervisor know the situation, for example by phone or email if possible.

It is important to note that your supervisor may not be an expert in every subject covered by the course. You should not expect your supervisor to mark your individual work or be necessarily able to answer detailed questions about particular aspects of the course. For specific queries you should contact the subject lecturer in the first instance.

Special supervision and/or classes may be arranged for the optional topics for Paper II. Please do keep your supervisors informed about other classes (rather than lectures) you wish to attend, as the Department may be charged for these.

Each term students are encouraged to write a short report on their progress on the Graduate Supervision System (GSS) [http://www.gss.ox.ac.uk/](http://www.gss.ox.ac.uk/). GSS is open for student reporting in weeks 6 and 7 each term. From week 8 onwards each term, the supervisor is responsible for writing a report about the student on GSS. Reports can be viewed by the student, supervisor, Director of Graduate Studies and College Advisor. Unsatisfactory progress will usually lead to discussion with appropriate college officers.

In the rare event of any dissatisfaction, a student should contact the Course Co-ordinator or Director of Graduate Studies to discuss changing supervisor.

**The MSc dissertation project**

MSc students are required to submit a dissertation of no more than 12,000 words. The dissertation project is mainly carried out over the summer period from late May to the dissertation submission date of noon on the second Monday in September.

Dissertations can be carried out on a variety of statistical topics. They are generally supervised by members of the Department. Students are welcome to suggest their own topics and should discuss their ideas with potential supervisors or with the MSc Course Co-ordinator.

Towards the end of Hilary Term, students wishing to suggest their own dissertation topic must submit the title and a brief statement of the form and scope of their project, together with the name of the person who has agreed to act as their supervisor for the dissertation. Alternatively the Department also provides a list of possible projects from which students can state a preference although students cannot be guaranteed to be allocated to a particular choice of project. Students will usually be able to maintain contact with the project supervisor during at least part of the summer. The supervisor of the project will usually not be the supervisor of the course work.

The dissertation is expected to include evidence that a student is capable of applying statistical research methods to realistic problems. Most dissertations will therefore contain an account of the analysis of some body of real data. Students are expected to find out most things by themselves by independent reading. Students should expect a maximum of six meetings in which progress is
discussed, and for the supervisor to read one or two drafts of the dissertation. Please be reasonable, and allow a week or so for work to be read; this is particularly important in planning final writing.

**It is not the supervisor’s job to undertake computer programming for the student**, and it is not part of the department’s function to provide detailed advice on statistical programming. Courses are provided to give students sufficient background, and students are expected to be able to write R functions for the project. It is a student’s responsibility when choosing a project to ensure that the computing needed is within the skills they feel able to learn. There may be rare projects of a computational nature in which the supervisor agrees in advance to provide specialist software development.

Students should expect to use the machines in the MSc Computing Laboratory for their dissertation project work. Students who need to use more than one PC or to leave a machine running unattended, should arrange this with the IT staff. Access to servers is only available for programs which are not available in Windows. Prior permission must be sought from the IT staff.

Students may examine selected dissertations from previous years in the Statistics library. These dissertations are for reference only and **must not** be removed from the library.

The dissertation should be typed and soft bound. Computer output should not be presented without pruning and annotation where necessary. The R code should appear in the appendix of the dissertation and will not be part of the word count.

The work should be a minimum 12pt and at least 1 ½ line spaced. It should include:

1) The title page

   Title, author, college and year of submission. Include the following at the bottom of the page, "A dissertation submitted in partial fulfilment of the requirements for the degree of Master of Science in Applied Statistics"

2) An abstract

3) Acknowledgements

4) A contents page

5) A bibliography

A good summary should be provided. The style of writing should be appropriate for a scholarly work: colloquialisms should be avoided. The dissertation must be carefully proof-read.

Candidates should make every effort to provide the appropriate references relating the work to the scientific literature, both in the subject matter under investigation and for the statistical and any other techniques used. References to published papers should be made carefully, with format similar to that used in standard journals. Particular emphasis should be given to the statistical aspects of the problem but the dissertation should show evidence of a reasonable understanding of the non-statistical features of the problem (e.g. the reasons for a particular scientific study).
In marking dissertations, the assessors will use the following criteria and weightings:

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRUCTURE</td>
<td>10%</td>
</tr>
<tr>
<td>• Understanding of aims</td>
<td></td>
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<tr>
<td>• Quality of general approach</td>
<td></td>
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<tr>
<td>LITERATURE AND THEORY</td>
<td>10%</td>
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<tr>
<td>• Quality of scrutiny of literature</td>
<td></td>
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<tr>
<td>• Understanding of relevant theory</td>
<td></td>
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<tr>
<td>EXPOSITION</td>
<td>20%</td>
</tr>
<tr>
<td>• Quality of exposition of source materials</td>
<td></td>
</tr>
<tr>
<td>• Quality of elaborations of source materials</td>
<td></td>
</tr>
<tr>
<td>• Quality of statistical reasoning</td>
<td></td>
</tr>
<tr>
<td>METHODOLOGY</td>
<td>30%</td>
</tr>
<tr>
<td>• Appropriateness of choice of techniques</td>
<td></td>
</tr>
<tr>
<td>• Quality of data-collection and/or handling</td>
<td></td>
</tr>
<tr>
<td>• Quality of computer work</td>
<td></td>
</tr>
<tr>
<td>• Accuracy</td>
<td></td>
</tr>
<tr>
<td>CONCLUSIONS</td>
<td>20%</td>
</tr>
<tr>
<td>• Appropriateness of conclusions drawn</td>
<td></td>
</tr>
<tr>
<td>• Understanding of implications and limitations</td>
<td></td>
</tr>
<tr>
<td>PRESENTATION</td>
<td>10%</td>
</tr>
<tr>
<td>• Clarity of style</td>
<td></td>
</tr>
<tr>
<td>• Quality of diagrams and tables</td>
<td></td>
</tr>
<tr>
<td>• Proper referencing to the literature</td>
<td></td>
</tr>
</tbody>
</table>

The assessors will take into account the difficulty of the project and the level of innovation shown.

The length of the dissertation should be no more than is required to present the project in a satisfactory manner and in any case no more than 12,000 words. Inordinately lengthy dissertations may lose marks. The R code used, appropriately pruned, should be included as an appendix to the dissertation. It will not contribute towards the word count.

Two copies of the soft-bound dissertation are to be submitted to the Examination Schools, High Street, by noon on 14 September 2015.

Details of submitting work to the Examination Schools can be found at http://www.ox.ac.uk/students/academic/exams/submission.

A declaration of authorship form must also be completed and submitted with the dissertation.

Students should pay particular attention to the University’s policies on plagiarism http://www.ox.ac.uk/students/academic/guidance/skills/plagiarism/.

The examiners also require students to send a PDF copy of their dissertation to the Academic Administrator by email (academic.administrator@stats.ox.ac.uk).

Students will receive feedback on their dissertation using the form on the following page.
MSc in Applied Statistics
DISSERTATION FEEDBACK FORM

Student Name:

Academic Year:

Dissertation Title:

[Tick one box for each of 1-6. The middle box corresponds to satisfactory work (and boxes to the right/left indicate stronger/weaker work). See also Section 2 of the Course Handbook for further explanation and for the weightings of criteria 1-6 below.]

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Structure</td>
<td>Serious lack of organization</td>
<td>A very good grasp of issues</td>
</tr>
<tr>
<td>2. Literature and Theory</td>
<td>Inadequate use of literature</td>
<td>Very good, meticulous</td>
</tr>
<tr>
<td>3. Exposition</td>
<td>Seriously incoherent, no attempt to fill gaps</td>
<td>Very clear showing outstandingly good thought and initiative</td>
</tr>
<tr>
<td>4. Methodology</td>
<td>Careless, poor approaches</td>
<td>Assiduous and of a very high quality throughout</td>
</tr>
<tr>
<td>5. Conclusions</td>
<td>Lack of comprehension of relevant issues</td>
<td>Exceptionally good insights</td>
</tr>
<tr>
<td>6. Presentation</td>
<td>Unclear, defective graphics and/or tables, inadequate referencing</td>
<td>Clear, excellent quality and meticulous in all regards</td>
</tr>
</tbody>
</table>

Final Mark:
MSc in Applied Statistics
DECLARATION OF AUTHORSHIP

Please submit the completed form to the Department of Statistics with your dissertation.

Name (in capitals): ________________________________

Candidate number: ______________________________

College (in capitals): ______________________________

Supervisor: ______________________________

Title of dissertation (in capitals): __________________

Word count: __________________

Please tick to confirm the following:

☐ I have read and understood the University’s disciplinary regulations concerning conduct in examinations and, in particular, of the regulations on plagiarism.

☐ I have read and understood the Education Committee’s information and guidance on academic good practice and plagiarism at http://www.ox.ac.uk/students/academic/guidance/skills/plagiarism

☐ The dissertation I am submitting is entirely my own work except where otherwise indicated.

☐ It has not been submitted, either wholly or substantially, for another degree of this University, or for a degree at any other institution.

☐ I have clearly signalled the presence of all material I have quoted from other sources, including any diagrams, charts, tables or graphs.

☐ I have clearly indicated the presence of all paraphrased material with appropriate references.

☐ I have not sought assistance from any professional agency.

☐ I have not copied from the work of any other candidate.

☐ I have not used the services of any agency providing specimen, model or ghostwritten work in the preparation of this dissertation.

☐ I agree to retain an electronic version of the work until the publication my final examination result. I agree to make any such electronic copy available to the examiners should it be necessary to confirm my word count or to check for plagiarism.

Candidate’s signature: ________________________________

Date: ________________________________

.................................................................
3. Examination Procedures

General University information on examinations can be found at http://www.ox.ac.uk/students/academic/exams.

There are two written examination papers:

<table>
<thead>
<tr>
<th>Paper I</th>
<th>Principles of statistical analysis</th>
<th>JAST 7120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper II</td>
<td>Further statistical methodology</td>
<td>JAST 7121</td>
</tr>
</tbody>
</table>

The written examinations will be held in Trinity Term either at the Examination Schools in the High Street or Ewert House in Summertown. The dates, times and place will be available at http://www.ox.ac.uk/students/exams/timetables/nearer the time.

Academic dress with subfusc clothing is worn. As the two examination papers and assessed practicals, and dissertation (for the MSc only) are compulsory, there is no entry form to be completed. The examiners may summon any candidate for an oral examination, but rarely do so.

Calculators, statistical tables and bilingual dictionaries

During the written examinations, electronic calculators may be used, subject to certain conditions set out in the Examination Regulations http://www.admin.ox.ac.uk/examregs/08-13_Part_13_Dictation_of_Papers_and_the_Use_of_WordProcessors.shtml

The Cambridge Elementary Statistical Tables will also be provided. These are available for viewing from 9 am – 12 noon, Monday-Friday, week 4, Trinity Term in 1 South Parks Road. Bilingual dictionaries, in book form only, may be used in the examination if required by candidates. These must not be marked in any way or contain any notes etc.

Examiners and assessors

There are three or four internal examiners and one external examiner appointed each year to examine the MSc and Diploma in Applied Statistics. The internal examiners are members of the Department of Statistics. One will act as the Chairman of Examiners. Assessors, who are usually the course lecturers, will be appointed to mark examination scripts. A number of members of the Department of Statistics will also be appointed as assessors to mark the dissertations.

Communication between examiners and candidates

Prior to the examinations, the Examiners will send out a notice to candidates outlining the examination arrangements. This will also be posted on the MSc WebLearn site.

The results for Diploma students will be known after the Examiner’s Meeting which takes place a few weeks after the examination. The results for MSc students are known in mid-October following submission of the dissertation in mid-September. The Examiners will release the final mark for each exam paper and for the assessed practical work after the June/July Examiners’ meeting. After the Examiners meeting in June/July for the Diploma, or October for the MSc, students should log on to Student Self Service at http://www.ox.ac.uk/current_students to obtain their final results.

Students are not permitted to contact the Examiners or the Assessors directly on any matter related to the examinations. Queries on examination matters should be directed to College Advisors, Departmental Supervisors or the Academic Administrator as appropriate.
**Past examination papers**

Students are strongly advised to work through past papers to familiarise themselves with the form of the examinations. Past examination papers can be found in WebLearn online at [http://missun29.offices.ox.ac.uk/pls/oxam/main](http://missun29.offices.ox.ac.uk/pls/oxam/main). Copies of outline solutions to examination papers from 2005 onwards can be borrowed on daily loan from the Reception at 1 South Parks Road. These must not be removed from the Department but may be photocopied.

During Trinity Term, students are also advised to attend revision classes or consultation sessions on individual courses.

Past examiners’ reports on the examinations are available via the MSc WebLearn site.

**Alternative examination needs**

Students requiring alternative examination arrangements should refer to the guidance at [http://www.ox.ac.uk/students/academic/exams/arrangements](http://www.ox.ac.uk/students/academic/exams/arrangements).

**Illness during examinations**

Examiners can be informed of any special circumstances (for example, ill-health) which may have affected a student’s performance before or during an examination. Students should contact their College Office as a matter of urgency should this situation arise, not the examiners or Department. It is helpful to provide evidence such as medical certificates. The College Senior Tutor (or other college officer) will then forward the information to the Examination and Assessments Team, who will pass it on to the Chairman of Examiners. If the information has been received after the marks have been finalised by the examiners, it will be passed to the Proctors. Applications will normally only be passed to examiners by the Proctors if they are received within three months of the publication of results and if one of the following applies:

(a) The candidate’s condition is such as to have prevented him or her from making an earlier submission; (b) The candidate’s condition is not known or diagnosed until after the final meeting of the examiners; or (c) There has been a procedural error that has prevented the candidate’s information from being submitted. Further details can be found in the Examination Regulations, section 13. [http://www.admin.ox.ac.uk/examregs/](http://www.admin.ox.ac.uk/examregs/)

**Resitting examinations**

If the examiners decide that a candidate’s work is not of sufficient merit to qualify for the MSc but of sufficient merit to qualify for the Diploma in Applied Statistics, the candidate is given the option of re-taking the MSc examination on one further occasion, not later than one year after the initial attempt, or of being issued with a Diploma. In the event of a candidate’s work not being of sufficient merit to qualify for the award of the MSc, the examiners will specify which of the components of the course may or must be redone. The results following a resit examination may only be available in October of the year in which the resit examination was held.

**Course regulations and syllabus**

The regulations for the course can be found in the University of Oxford Examination Regulations, ([http://www.admin.ox.ac.uk/examregs/Applied_Statistics.shtml](http://www.admin.ox.ac.uk/examregs/Applied_Statistics.shtml) and [http://www.admin.ox.ac.uk/examregs/32-69_DIPLOMA_IN_APPLIED_STATISTICS.shtml](http://www.admin.ox.ac.uk/examregs/32-69_DIPLOMA_IN_APPLIED_STATISTICS.shtml)). The Examination Regulations should be consulted for regulations concerning conduct of examinations and general regulations for graduate students. The Lecture Synopses defines the detailed content of the course for each year.

The examination conventions for 2014/2015 will be available via the course Weblearn site.
Prize
The Gutierrez Toscano Prize in Applied Statistics, value £150, may be awarded by the examiners, if there is a candidate of sufficient merit, to the candidate whose performance in that examination they judge to be the best.

The prize is named in memory of Pablo Gutiérrez Toscano, who was awarded a distinction in the MSc in Applied Statistics in 1996. In 1998 he was tragically killed in a road accident. His family and friends offered a donation to establish the annual prize.
http://www.stats.ox.ac.uk/about_us/gutierrez_toscano_prize
DRAFT
EXAMINATION CONVENTIONS: MSc IN APPLIED STATISTICS
(Subject to amendment in Michaelmas Term 2014)

1. Assessment

For MSc candidates the overall assessment is based on:

1. Paper I Principles of Statistical Analysis
2. Paper II Further Statistical Methodology
3. Assessed Practical Work

2. Weighting

Each of (1)–(4) has equal weight, i.e. each contributes 25% to the overall MSc assessment.

The assessed practical work (3) will be made up of practical assignments in Michaelmas Term and Hilary Term and a week-long practical assessment in Trinity Term.

The relative weightings of the practical assignments are as follows:

- practical assessments in Michaelmas and Hilary Terms: 50%
- practical assessment in Trinity Term: 50%

Indications of marks given for the practical work in Michaelmas and Hilary Terms are provisional.

Candidates can pass, pass with distinction or fail. In order to pass, a candidate must achieve an average of at least 40% on (1) and (2), a mark of at least 40% on (4), and an overall average of at least 50% on (1)–(4). 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 (1)–(4) shall not normally be eligible for the award of distinction.

Any candidate who does not meet the requirements to pass, fails the MSc. Any candidate who just fails the MSc can be allocated a pass on the Diploma if they show, in the view of the examiners, understanding and competence equivalent to passing the Diploma.

On Paper I there will be 6 questions (3 on Statistical Methods, 2 on Statistical Theory and 1 on R Programming). The examination rubric on Paper I will state that ‘All questions should be attempted.’

On Paper II there will be 5 half-questions on the core topics in Further Statistical Methods and 2 full questions on Statistical Data Mining and Machine Learning. There will be 6 full questions on the optional topics (1 full question each on Survival Analysis and Stochastic Models in Mathematical Genetics; 2 full questions on Advanced Simulation Methods; and 2 full questions on SB4b Actuarial Science II). For Advanced Simulation Methods, the first question will be on material covered under the first three headings in the synopsis, namely: Classical methods, Importance sampling, MCMC methods.
The examination rubric on Paper II will state that ‘Candidates should attempt questions totalling the equivalent of 5 full questions, with the equivalent of at least 2 full questions on the core topics’.

**MSc in Applied Statistics qualitative descriptors**

**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.)

**Double marking**
For the examination papers and assessed practicals, there are precise model solutions and marking schemes approved by the examiners. Each answer will be marked by an examiner or assessor, and will also be checked independently (not necessarily by an examiner or assessor) to ensure that all parts have been marked and the marks and part-marks have been correctly totalled and recorded. A mark of zero will be awarded for any part or parts of questions that have not been answered.

Each dissertation will be marked independently by two examiners or assessors (neither of whom will be the dissertation supervisor).

**Reconciliation procedures**
When the two marks for a dissertation differ by 10% or less, the two marks will be averaged. In the other cases, there will be a discussion between the two examiners or assessors concerned, after which it will normally be possible for a mark to be agreed. In any exceptional cases a third examiner or assessor will normally read the dissertation before the Examiners agree a mark. The dissertations of borderline candidates are reviewed by the Examiners who will agree the final dissertation mark.

**Scaling**
If the marks on the part of the assessment appear not to be in line with the qualitative descriptions of a distinction or a pass, then this will be taken into account and candidates’ marks may be moderated accordingly.

**Late or non-submission of practical work**
Where permission for late submission has not been granted by the MSc Supervisory Committee, the MSc Supervisory Committee may impose a penalty not exceeding the credit available for that piece of work. The Committee will take into account such factors as:
1. The evidence forwarded to them by the student.
2. The degree of advantage gained by the extra time made available to the student relative to the time that was available to complete coursework by the original deadline
3. The weight to be attached to the reason given, if any, for late submission.

**Late submission of dissertations**

Late submission of MSc dissertations will normally result in the following penalties.

Where permission for late submission has been granted by the Proctors, no penalty will be imposed.

Where permission for late submission has not been granted by the Proctors, the normal penalties based on a submission deadline of Monday 12 noon are as follows:

<table>
<thead>
<tr>
<th>Lateness</th>
<th>Cumulative mark penalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 4 hours, ie up to Monday 4 pm</td>
<td>1</td>
</tr>
<tr>
<td>4-24 hours, ie up to Tuesday 12 noon</td>
<td>10</td>
</tr>
<tr>
<td>24-48 hours, ie up to Wednesday 12 noon</td>
<td>20</td>
</tr>
<tr>
<td>48-72 hours, ie up to Thursday 12 noon</td>
<td>30</td>
</tr>
<tr>
<td>72-96 hours, ie up to Friday 12 noon</td>
<td>40</td>
</tr>
<tr>
<td>96-101 hours, ie up to Friday 5 pm</td>
<td>50</td>
</tr>
</tbody>
</table>

The cumulative penalty above would be deducted from the dissertation mark, when the dissertation mark is expressed out of 100. For example, if a student submits a dissertation 20 hours late, and that dissertation in itself is worth 65 marks, then the penalty above means that s/he loses 10 marks and so the final mark is 55. (The final mark cannot be negative, it is truncated at zero if necessary.)

Where permission for late submission has not been granted by the Proctors and the dissertation is over 101 hours late, the Examiners would refer the case to the Proctors for guidance as to what penalty to impose.

Note that late submission of the dissertation may result in the Examiners deferring consideration to the following year.

**Two** copies of the dissertation are to be submitted to the Examination Schools, High Street, by noon on 14 September 2015. Details of submitting work to the Examination Schools can be found at [http://www.ox.ac.uk/students/exams/submissions/](http://www.ox.ac.uk/students/exams/submissions/).

[Dissertation marking criteria and weightings –see section on the MSc Dissertation Project]

**Examiners**

The internal examiners are:
Dr Neil Laws (Chairman)
Dr Robin Evans
Dr Geoff Nicholls.

The external examiner is:
Professor Jane Hutton, University of Warwick.
EXAMINATION CONVENTIONS: DIPLOMA IN APPLIED STATISTICS
(Subject to amendment in Michaelmas Term 2014)

For Diploma candidates the overall assessment is based on:

1. Paper I Principles of Statistical Analysis
2. Paper II Further Statistical Methodology
3. Assessed Practical Work

The assessed practical work (3) will be made up of practical assignments in Michaelmas Term and Hilary Term and a week-long practical assessment in Trinity Term.

The relative weightings of the practical assignments are as follows:

- practical assessments in Michaelmas and Hilary Terms: 50%
- practical assessment in Trinity Term: 50%

Indications of marks given for the practical work in Michaelmas and Hilary Terms are provisional.

Candidates can pass, pass with distinction, or fail. In order to pass, a candidate must achieve an average of at least 40% on (1) and (2), weighted in the proportion 3:2, and an overall average of at least 50% on (1), (2) and (3), weighted in the proportion 3:2:3. An overall average of 70%, weighted in the proportion 3:2:3, is required for a distinction. Candidates who have initially obtained a mark of less than 50% on any of (1)-(3) shall not normally be eligible for the award of distinction.

On Paper I there will be 6 questions (3 on Statistical Methods, 2 on Statistical Theory and 1 on R Programming). The examination rubric on Paper I will state that ‘All questions should be attempted.’

On Paper II there will be 5 half-questions on the core topics in Further Statistical Methods and 2 full questions on Statistical Data Mining and Machine Learning. There will be 6 full questions on the optional topics (1 full question each on Survival Analysis and Stochastic Models in Mathematical Genetics; 2 full questions on Advanced Simulation Methods; and 2 full questions on SB4b Actuarial Science II). For Advanced Simulation Methods, the first question will be on material covered under the first three headings in the synopsis, namely: Classical methods, Importance sampling, MCMC methods.

The examination rubric on Paper II will state that ‘Candidates should attempt questions totalling the equivalent of 5 full questions, with the equivalent of at least 2 full questions on the core topics’.

[Sections on qualitative descriptors, double marking, reconciliation, scaling, late submission of practical work, and examiners as for the MSc above]
Complaints and academic appeals within the Department of Statistics

1. The University, the Mathematical, Physical and Life Sciences Division and the Department of Statistics all hope that provision made for students at all stages of their programme of study will make the need for complaints (about that provision) or appeals (against the outcomes of any form of assessment) infrequent.

2. However, all those concerned believe that it is important for students to be clear about how to raise a concern or make a complaint, and how to appeal against the outcome of assessment. The following guidance attempts to provide such information.

3. Nothing in this guidance precludes an informal discussion with the person immediately responsible for the issue that you wish to complain about (and who may not be one of the individuals identified below). This is often the simplest way to achieve a satisfactory resolution.

4. Many sources of advice are available within colleges, within departments and from bodies like Oxford University Students’ Union or the Counselling Service, which have extensive experience in advising students. You may wish to take advice from one of these sources before pursuing your complaint.

5. General areas of concern about provision affecting students as a whole should, of course, continue to be raised through the Graduate Liaison Committee or via student representation on the department’s committees.

Complaints

6.1 If your concern or complaint relates to teaching or other provision made by the Department, then you should raise it with the Director of Graduate Studies (Professor Gesine Reinert in Michaelmas and Hilary Terms, and Professor Colin McDiarmid in Trinity Term) for graduate students. Within the department the officer concerned will attempt to resolve your concern/complaint informally.

6.2 If you are dissatisfied with the outcome, then you may take your concern further by making a formal complaint to the University Proctors (http://www.admin.ox.ac.uk/proctors/complaints.shtml). A complaint may cover aspects of teaching and learning (eg teaching facilities or supervision arrangements), or non-academic issues (eg support services, library services, university accommodation or university clubs and societies). A complaint to the Proctors should be made only if attempts at informal resolution have been unsuccessful. The procedures adopted by the Proctors for the consideration of complaints and appeals are described in the Proctors and Assessor’s Memorandum and the relevant Council regulations (http://www.admin.ox.ac.uk/statutes/regulations/).

7. If your concern or complaint relates to teaching or other provision made by your college, then you should raise it either with your college advisor or with the Senior Tutor or Tutor for Graduates (as appropriate). Your college will also be able to explain how to take your complaint further if you are dissatisfied with the outcome of its consideration.

Academic appeals

8. An appeal is defined as a formal questioning of a decision on an academic matter made by the responsible academic body.
9. For taught graduate courses, a concern which might lead to an appeal should be raised with your college authorities and the individual responsible for overseeing your work. **It must not be raised directly with examiners or assessors.** If it is not possible to clear up your concern in this way, you may put your concern in writing and submit it to the Proctors via your college. As noted above, the procedures adopted by the Proctors in relation to complaints and appeals are on the web ([http://www.admin.ox.ac.uk/statutes/regulations/](http://www.admin.ox.ac.uk/statutes/regulations/)).

10. For the examination of research degrees, or in relation to transfer or confirmation of status, your concern should be raised initially with the Director of Graduate Studies. Where a concern is not satisfactorily settled by that means, then you, your supervisor, or your college authority may put your appeal directly to the Proctors.

11. Please remember in connection with all the cases in paragraphs 8-10 that:

(a) The Proctors are not empowered to challenge the academic judgement of examiners or academic bodies.
(b) The Proctors can consider whether the procedures for reaching an academic decision were properly followed; i.e. whether there was a significant procedural administrative error; whether there is evidence of bias or inadequate assessment; whether the examiners failed to take into account special factors affecting a candidate’s performance.
(c) On no account should you contact your examiners or assessors directly.

12. The Proctors will indicate what further action you can take if you are dissatisfied with the outcome of a complaint or appeal considered by them.
Academic Integrity and the avoidance of Plagiarism

Academic integrity
The University’s code of practice concerning academic integrity in research is set out on the website at http://www.admin.ox.ac.uk/personnel/cops/researchintegrity/, and, while the code’s principles relate specifically to the conduct of research, all graduate students are advised to make themselves aware of the document’s contents. The University code of practice on Public Interest Disclosure can be found at http://www.admin.ox.ac.uk/personnel/cops/pid/.

Plagiarism
University Definition – see http://www.ox.ac.uk/students/academic/guidance/skills/plagiarism
Plagiarism is the copying or paraphrasing of other people’s work or ideas into your own work without full acknowledgement. All published and unpublished material, whether in manuscript, printed or electronic form, is covered under this definition. Collusion is another form of plagiarism involving the unauthorised collaboration of students (or others) in a piece of work.

Cases of suspected plagiarism in assessed work are investigated under the disciplinary regulations concerning conduct in examinations. Intentional or reckless plagiarism may incur severe penalties, including failure of your degree or expulsion from the university.

Why does plagiarism matter?
It would be wrong to describe plagiarism as only a minor form of cheating, or as merely a matter of academic etiquette. On the contrary, it is important to understand that plagiarism is a breach of academic integrity. It is a principle of intellectual honesty that all members of the academic community should acknowledge their debt to the originators of the ideas, words, and data which form the basis for their own work. Passing off another’s work as your own is not only poor scholarship, but also means that you have failed to complete the learning process. Deliberate plagiarism is unethical and can have serious consequences for your future career; it also undermines the standards of your institution and of the degrees it issues.

What forms can plagiarism take?
- Verbatim quotation of other people’s intellectual work without clear acknowledgement. Quotations must always be identified as such by the use of either quotation marks or indentation, with adequate citation. It must always be apparent to the reader which parts are your own independent work and where you have drawn on someone else’s ideas and language.

- Paraphrasing the work of others by altering a few words and changing their order, or by closely following the structure of their argument, is plagiarism because you are deriving your words and ideas from their work without giving due acknowledgement. Even if you include a reference to the original author in your own text you are still creating a misleading impression that the paraphrased wording is entirely your own. It is better to write a brief summary of the author’s overall argument in your own words than to paraphrase particular sections of his or her writing. This will ensure you have a genuine grasp of the argument and will avoid the difficulty of paraphrasing without plagiarising. You must also properly attribute all material you derive from lectures.

- Cutting and pasting from the Internet. Information derived from the Internet must be adequately referenced and included in the bibliography. It is important to evaluate carefully
all material found on the Internet, as it is less likely to have been through the same process of scholarly peer review as published sources.

- **Collusion.** This can involve unauthorised collaboration between students, failure to attribute assistance received, or failure to follow precisely regulations on group work projects. It is your responsibility to ensure that you are entirely clear about the extent of collaboration permitted, and which parts of the work must be your own.

- **Inaccurate citation.** It is important to cite correctly, according to the conventions of your discipline. Additionally, you should not include anything in a footnote or bibliography that you have not actually consulted. If you cannot gain access to a primary source you must make it clear in your citation that your knowledge of the work has been derived from a secondary text (e.g. Bradshaw, D. *Title of book*, discussed in Wilson, E., *Title of book* (London, 2004), p. 189).

- **Failure to acknowledge.** You must clearly acknowledge all assistance which has contributed to the production of your work, such as advice from fellow students, laboratory technicians, and other external sources. This need not apply to the assistance provided by your tutor or supervisor, nor to ordinary proofreading, but it is necessary to acknowledge other guidance which leads to substantive changes of content or approach.

- **Professional agencies.** You should neither make use of professional agencies in the production of your work nor submit material which has been written for you. It is vital to your intellectual training and development that you should undertake the research process unaided.

- **Autoplagiarism.** You must not submit work for assessment which you have already submitted (partially or in full) to fulfil the requirements of another degree course or examination.

The necessity to reference applies not only to text, but also to other media, such as computer code, illustrations, graphs etc. It applies equally to published text drawn from books and journals, and to unpublished text, whether from lecture handouts, theses or other students’ essays. You must also attribute text or other resources downloaded from web sites.

Cases of apparently deliberate plagiarism are taken extremely seriously, and where examiners suspect that this has occurred, they bring the matter to the attention of the Proctors. Your attention is drawn to the Proctors’ and Assessor’s Memorandum, Section 9.5, ‘Conduct in Examinations’, and in particular to sections 4 and 5 and the concluding paragraph of the section:

4 **No candidate shall present for an examination as his or her own work any part or the substance of any part of another person’s work.**

5 **In any written work (whether thesis, dissertation, essay, coursework, or written examinations) passages quoted or closely paraphrased from another person’s work must be identified as quotations or paraphrases, and the source of the quoted or paraphrased material must be clearly acknowledged.**

The University employs software applications to detect plagiarism in submitted examination work, both in terms of copying and collusion. It regularly monitors on-line essay banks, essay-writing services, and other potential sources of material. It reserves the right to check samples of submitted essays for plagiarism. Although the University strongly encourages the use of electronic resources by students in their academic work, any attempt to draw on third-party material without proper attribution may well attract severe disciplinary sanctions.
4. Sources of advice and help

Welfare
Students are always welcome at any time to discuss their concerns with their Departmental Supervisor, the MSc Course Co-ordinator, the Director and Deputy Director of Graduate Studies, the Head of Department or the Academic Administrator as appropriate. Support is also available via College Advisors and College Offices.

Every graduate student at Oxford has a College Adviser, who is an academic member of his or her College, usually a Fellow.

The role of the College Adviser is additional and complementary to that provided in the student’s department or faculty. The College Adviser is not expected to perform the role of the Department Supervisor, or to be responsible for directing students’ academic work. Rather, the intention is to provide a focal point for an individual student’s relationship with the College, and general academic or pastoral advice and assistance throughout the student’s course of study.

Other sources of advice and help include:

Student Counselling Service  
[http://www.ox.ac.uk/students/welfare/counselling/](http://www.ox.ac.uk/students/welfare/counselling/)

Oxford University Student Union  

Nightline  
[http://users.ox.ac.uk/~nightln/](http://users.ox.ac.uk/~nightln/)

Current information for students – health and welfare  
[http://www.ox.ac.uk/students/shw/](http://www.ox.ac.uk/students/shw/)

Harassment
The Departmental advisors on matters of harassment are Mrs Jennie McKenzie (room 1.208, 1 South Parks Road), tel 72869, email mckenzie@stats.ox.ac.uk or Dr Neil Laws (room 1.302, 1 South Parks Road), tel 72597, email laws@stats.ox.ac.uk. The University’s Policy on Harassment including Bullying can be found at [http://www.admin.ox.ac.uk/eop/harassmentadvice/](http://www.admin.ox.ac.uk/eop/harassmentadvice/)

Disability
The Disability contact is Mrs Jan Boylan (room 1.101, 1 SPR), tel. ext 72870, email boylan@stats.ox.ac.uk. For University guidance and support please refer to [http://www.admin.ox.ac.uk/eop/disab/](http://www.admin.ox.ac.uk/eop/disab/) and [http://www.ox.ac.uk/students/welfare/disability/](http://www.ox.ac.uk/students/welfare/disability/)

Childcare Services
Information on the University’s childcare services can be found at [http://www.admin.ox.ac.uk/childcare/](http://www.admin.ox.ac.uk/childcare/)

University policies
Access to University policies on a wide range of issues can be found via the Student Gateway at [http://www.ox.ac.uk/current_students/index.html](http://www.ox.ac.uk/current_students/index.html).

These policies include:
Equal Opportunity Policy for Students  
[http://www.admin.ox.ac.uk/eop/universityofoxfordequalitypolicy/](http://www.admin.ox.ac.uk/eop/universityofoxfordequalitypolicy/)
Race Equality Policy
http://www.admin.ox.ac.uk/eop/race/policy/
Code of conduct for using IT facilities
http://www.it.ox.ac.uk/legal/rules/

Financial matters
Information on fees and funding matters can be found at
http://www.ox.ac.uk/students/fees_funding_living_costs/
Information on hardship funding can be found at
http://www.ox.ac.uk/feesandfunding/graduates/targetedsupport/hardship

The Careers Service
The University Careers Service can be found at 56 Banbury Road with a website at
http://www.careers.ox.ac.uk/. It is a free service for all Oxford University students including postgraduates, and also for alumni. It provides one to one guidance, support and advice; information on occupations, vacancies and further study, feedback on CVs and application forms; and skills coaching for preparing for interviews and making applications.

The Careers Service also runs the University Internship Programme

Information about studying for a DPhil in Statistics at the University of Oxford can be found at
http://www.stats.ox.ac.uk/prospective_students/research_degrees

University Language Centre
International students, whose first language is not English, are strongly advised to visit the University Language Centre to find out more about the courses on topics such as Academic Writing and Advanced Communication Skills which run during term time. These have a registration fee for graduate students. Details are available at http://www.lang.ox.ac.uk/courses/english.html.

Student feedback and representation
At the end of each term students are invited to complete a short feedback questionnaire covering the lecture courses, practical sessions and supervisory sessions. We encourage students to complete and return these. All comments are anonymous. The overall results are discussed by the MSc Supervisory Committee, which will provide a summary and its response via WebLearn, and are important part of our quality assurance procedures as part of the continuing review and development of the course.

Students are also invited to take part in the National Student Survey (http://www.unistats.com/) at the appropriate time of the year. See also http://www.ox.ac.uk/students/life/feedback.

The MSc and Diploma students are invited to elect, soon after the beginning of the academic year, two representatives who can act as a link with the staff, and in particular bring to light and discuss any problems that might arise. The representatives will be invited to attend the Graduate Liaison Committee which meets once a term in week 5.
See http://www.stats.ox.ac.uk/current_students/research_degrees/graduate_liaison_committee

Suspension of status or withdrawal from course
Should you find that you need to apply to suspend your status on the course or wish to withdraw, you should discuss this with the Course Co-ordinator and also your College Office or College Tutor. The relevant forms to be completed can be found at
http://www.ox.ac.uk/students/academic/graduates/forms/#d.en.7466.
**After the course**

At the end of the course, students should ensure that they have returned all library books. Students should contact their supervisor if a reference is required.

Information on academic transcripts can be found at [http://www.ox.ac.uk/students/graduation/transcripts](http://www.ox.ac.uk/students/graduation/transcripts). Students receive one copy of the final transcript automatically on completion of the degree. Further copies can be ordered.

You will receive an email with information about booking a degree ceremony. See [http://www.ox.ac.uk/students/graduation/ceremonies/](http://www.ox.ac.uk/students/graduation/ceremonies/) for further information.
5. Departmental Facilities

*Computing*

Students have access to all the public computing facilities of the Department of Statistics. The principal computing resources for the MSc are the PC laboratories. Students can use these to run software packages such as R and MATLAB, as well as to prepare documents and reports. Printers are attached to each network.

The practical sessions will introduce students to the use of the departmental computing systems and to the main statistics packages. Other courses, particularly those on high-level programming languages, which are provided by the University’s IT Services in Banbury Road may be of interest to students [http://www.oucs.ox.ac.uk/](http://www.oucs.ox.ac.uk/). Project work in the summer will normally require the use of a computer. Please refer to the section on the dissertation for further information.

MSc Students will be allocated 1000 prints/photocopies consisting of 900 black & white and 100 colour. Additional print allocation can be bought from the IT staff at a cost of £10.00 per 500 prints (450 B&W 50 colour).

You should also make yourself aware of the following departmental documents:

- Guide to Computing Services
- Guidelines for Examining Users’ Data
- Security and Privacy of Files
- Policy Statement on Computer Use, Monitoring and Surveillance.

These are available at [http://www.stats.ox.ac.uk/about_us/it_information/generalaccess/new_users_start_here](http://www.stats.ox.ac.uk/about_us/it_information/generalaccess/new_users_start_here) along with details of how to use your laptop on the Oxford Wireless LAN.

*Libraries*

The Department of Statistics has its own small library in 1 South Parks Road. Further details of the Statistics library facilities are to be found later in this handbook.

The University Card also serves as a library card and will allow access to the Radcliffe Science Library (RSL) in Parks Road, and also the Social Studies Library, Manor Road. A map can be found at [http://www.ox.ac.uk/visitors/maps-and-directions/museums-libraries-and-places-of-interest](http://www.ox.ac.uk/visitors/maps-and-directions/museums-libraries-and-places-of-interest).

The Physical Sciences Librarian with responsibility for the statistics collection in the RSL is Ljilja Ristic (email [ljilja.ristic@bodley.ox.ac.uk](mailto:ljilja.ristic@bodley.ox.ac.uk)). A specific training session for statistics research is held in Hilary Term.

College libraries may also be useful although access is usually restricted to members of that college.

Links to the University’s e-resources, including electronic journals can be found at [http://www.ouls.ox.ac.uk/eresources](http://www.ouls.ox.ac.uk/eresources)
Department of Statistics Library - Rules and Information

1. **Admittance to the Library**

The library can be found on the first floor at 1 South Parks Road. All new readers must register with the Academic Administrator, (Room 1.101, email lib@stats.ox.ac.uk). A current University card is required for registering and for entry to the library.

2. **To find a book**

Most of the departmental books and journals are catalogued on SOLO, the University’s on-line catalogue. SOLO can be accessed through the library terminal.

The lending books are currently undergoing a process of re-shelving using Library of Congress classifications. Shelves have been marked accordingly.

The other library sections are as follows:

- **100. White spine labels** - Main statistics lending section
  Sections also on introductory statistics; history of statistics; and general study skills.

- **200. Yellow** - Probability and operational research

- **300. Green** - Genetics and Biology

- **400. Orange** - Mathematics and computation

- **700. Gold** - Reference only. These books may not be borrowed.

There is also a lending stack area in the farthest room. These books may be borrowed. Periodicals, dissertations and theses are for reference only.

3. **To borrow a book**

Books are borrowed on a self-issue basis by scanning into the self-issue computer firstly the barcode from the reader’s University card, and then the barcode sticker inside the front cover of the book to be borrowed.

Each book borrowed must be recorded on the self-issue computer in the library. The department is small and so is the library budget. Stolen books have to be replaced, reducing the budget for new books. Reference books, journals, dissertations and theses and any items without barcodes cannot be borrowed.

4. **To return a book**

Books should be left in the returns box in the library. If books are overdue then reminder notices will be sent out by email. If a book is reserved by another reader or needs to be recalled then a reader may receive a notice, again by email.
5. **To reserve a book**

Reservation requests can be made via SOLO, the University’s library catalogue. Reserved books can be collected from room 1.101.

6. **Loan periods**

MSc students can borrow books for one week and then can be renewed on a further three occasions unless recalled by the library.

Loans may be renewed either by using SOLO before the due date, by checking them out again, or by e-mailing lib@stats.ox.ac.uk

7. **Rules of conduct**

These rules apply to all library readers. Breaches of library rules may lead to suspension of borrowing privileges, fines or suspension from the use of the library.

- Every book borrowed must be recorded on the self-issue computer in the library. Books must be returned by the due date or renewed. Any book recalled by the library must be returned as soon as possible.

- No reader may have more than **nine** books in their possession.

- Returned books must be replaced in the returns box. A reader is responsible for a book until it is returned to the library.

- Replacement costs will be charged for lost, damaged or defaced books.

- Eating and drinking are **not permitted** in the library except for bottled water.

- Please be considerate to other users and keep noise to a minimum.

- The library computers **must not** be unplugged or switched off.

- Personal belongings should not be left unattended in the library. Any such items will be removed. The Department will not be responsible for personal belongings which are stolen or damaged.

- The library door should be kept locked at all times. Only the Librarian or Academic Administrator may give access to non-members of the Department.

- Reference books and journals may only be removed for photocopying within the Department and must be returned immediately.

- Photocopies may only be made in compliance with copyright law. Details are displayed by the Departmental printers/photocopiers.
Department of Statistics - General Information

Access to the Department’s Buildings
The Department’s buildings at 1 and 2 South Parks Road (SPR) are accessible by the University card 24 hours a day, 7 days a week including bank holidays; administrative staff are on duty from 8.30 am to 5.30 pm (Monday to Thursday) and 8.30 am to 4.30 pm (Friday) (except from 1–2 pm Thursday and Friday). All occupants working in these buildings after 7 pm or at any time on weekends or public holidays must record their presence by signing the In and Out book (found in 1 SPR by the pigeonholes in the foyer and in 2 SPR on top of the safe, underneath the stairs in the foyer).

Care of Buildings
As there is no caretaker for 1 and 2 SPR, we ask all users of the buildings to help with security. Please leave windows and doors secure; and follow the security notices posted in the buildings. Please report any infringements, lighting failures or problems needing the attention of the surveyors or cleaners, etc. to buildings@stats.ox.ac.uk.

Please do not switch off hall/stairway lighting at any time.
It is illegal to smoke in any of the buildings.
The lift in 1 SPR should not be used out of general office hours.

Printing/Photocopying
Individual photocopying/printing accounts are set up by the IT staff. Access to the machines in the buildings is then available by means of your university card number. MSc Students will be allocated 1000 prints/photocopies. Additional print allocation can be bought from the IT staff at a cost of £10 per 500 prints. Copyright law applies. A comb binding machine is available on the second floor in 1 South Parks Road.

Post
Pigeonholes in the entrance hall of 1 South Parks Road are appropriately marked for incoming post, items outgoing by University Messenger or Royal Mail post and for Department Members.
University Messenger Service collects and delivers mail for the departments and colleges of the University.
Royal Mail is franked and sent out by the administration staff each afternoon. Where Departmental business is not involved, you should make your own arrangements. Non-staff business items will be franked if approved by an academic member of staff.

Telephones
Currently all telephones in public areas have access for internal University use and 999 calls only.

Kitchen facilities and Common Rooms
Facilities and provisions for making tea and coffee are available in the kitchen in both 1 and 2 South Parks Road. Tea and coffee are free. The fridges are kept stocked with milk, but otherwise are available for use for storage of small quantities of perishable food. Please keep the kitchens tidy. If reheating food in the microwave in 1 SPR, it would be appreciated if you would bear in mind that some smells may offend.

A Common Room is available next to the kitchen in 1 SPR and there is a daily newspaper available. Please do not remove newspapers from the Common Room. In 2 SPR, room 2.113 is available as a Common Room when it is not in use for meetings, as indicated on the door.

Please do not take food or drink into the Computer Labs or the Lecture Room.
Lost property
Items which have been found in 1 and 2 South Parks Road are lodged with the Administrative Assistant in 1.109. The items are disposed of at the end of each term.

Emergencies, Security and Safety

The safety officer is Dr Matthias Winkel.

Fire:
Please read the blue fire-action notices posted in the buildings and familiarise yourself with the escape routes. If there is a fire emergency, immediately break the glass on the nearest fire alarm point and then call both Security Services (89999) and the Fire Brigade ((9)999). Operate extinguishers only if this does not put you at risk and otherwise vacate the building immediately.

On hearing the fire alarm ringing please leave the building immediately. DO NOT stop to pick up your belongings. If you are the last person to leave the room please close the door. The assembly points are outside 1 South Parks Road if the fire is in 2 South Parks Road, and 2 South Parks Road if the fire is in no 1. Do not re-enter the building until told by someone in authority that it is safe to do so. Someone in authority means either the Head of Department, the Administrator or the Health & Safety Officer, or in their absence a fire officer.

Security:
Theft of personal items does occur from time to time. It is important to remain aware of this and help maintain the security of the buildings. The entrance doors, library door and computer room doors should remain locked at all times. All windows should be closed and latched outside normal working hours. Security blinds in the Lecture Room and Common Room should be locked outside normal working hours. Personal belongings should not be left unattended at any time.

The University Security Service can be reached by phone on 89999.

First Aid: lists of qualified First Aiders are posted in the entrance hall to each building and First Aid Kits are in the kitchens of 1 and 2 South Parks Road. Out of hours, please phone 89999 for first aid assistance. For an ambulance phone (9)999.

Fires, security alerts and serious accidents must be reported to the Administrator and the scene of report must remain undisturbed. Safety information is filed in the Administrator’s room and the latest Departmental reports are on the notice board in 1 SPR.