



UNIVERSITY OF OXFORD
DEPARTMENT OF STATISTICS

**MSc AND DIPLOMA IN APPLIED
STATISTICS**

2008-2009

STUDENT HANDBOOK

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MSc/ DIPLOMA IN APPLIED STATISTICS 2008/2009

1. Introduction

Overview

Welcome to the MSc and Diploma in Applied Statistics in the Department of Statistics, University of Oxford.

The MSc 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 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.

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

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.

Each of these parts has equal weight and contributes 25% to the overall total mark. Candidates can pass, pass with distinction, or fail.

In order to pass, a candidate must achieve an average of at least 40% in the two examination papers, a mark of at least 40% for the dissertation, and an overall average of at least 50% for the examination papers, assessed practical work and dissertation together. An overall average of at least 70% is required for a distinction.

Distinction candidates will show excellence over a wide range of topics. Passing candidates will show good or very good work over a reasonable range of topics. These descriptions are of overall performance: weaker performance in part of the overall assessment can be compensated for, if the overall performance merits it. Candidates who just fail 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.

If the marks on part of the assessment appear problematic when compared with the above descriptions of a distinction and a pass, then this will be taken into account and candidates' marks may be moderated accordingly

Diploma students take only the written examination papers and the assessed practical work. Candidates can pass, pass with distinction, or fail. In order to pass, a candidate must achieve an average of at least 40% on the two written examination papers, weighted in the proportion 3:2, and an overall average of at least 50% on Paper I, Paper II and the assessed practical work, weighted in the proportion 3:2:3. An overall average of 70%, weighted in the proportion 3:2:3, is required for a distinction.

Distinction candidates will show excellence over a wide range of topics. Passing candidates will show good or very good work over a reasonable range of topics. These descriptions are of overall performance: weaker performance in part of the overall assessment can be compensated for, if the overall performance merits it.

Written Examination Paper I *Principles of Statistical Analysis*

JAST 7120

This examination paper consists of compulsory questions on the core subjects:

- Statistical Methods
- Statistical Theory
- Survival Analysis
- Time Series Analysis

Written Examination Paper II *Further Statistical Methodology*

JAST 7121

This examination paper consists of questions taken from the core subjects:

- Multivariate Analysis
- Further Statistical Methods
- Computer Intensive Statistics
- MCMC and Applied Bayesian Statistics

and also from the optional subjects:

- Infectious Diseases
- Combinatorial Optimisation
- Stochastic Models in Mathematical Genetics
- Actuarial Science
- Statistical Data Mining

The guidelines are 75 hours of lectures or equivalent work for each written examination papers. Students are expected to undertake 20-30 hours of study on the optional courses. Generally one examination question is set per 8–10 hour lecture course but a question would also usually be set for a 6 hour lecture course.

Assessed Practical Work

In recent years the assessed practical work has been made up of 2 computer-based practical assignments in Michaelmas Term, 2 practical assignments in Hilary Term, and a Practical Assessment in week 5 of Trinity Term. These are normally based on exercises done in the weekly practical classes. There is also a week-long practical assessment in Trinity Term. In past years this has taken place in week 5. This comprises a number of exercises involving the analysis of datasets. A complete report is required at the end of the week. Each of the shorter practical assignments contributes 12.5% to the overall assessed practical mark and the week-long Trinity Term practical 50%. You will be told if there are any changes to these guidelines.

Interim marks given for the practical assignments in Michaelmas and Hilary terms are provisional and may be subject to further moderation.

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 the last written examination to the dissertation submission date on 15 September but project supervisors regularly encourage students to do preparatory background reading on their projects before the examinations.

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 Amber Tomas, the MSc Course Co-ordinator. 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.

2. Course Information

Term Dates and residence requirements

Lecturing is concentrated in three eight-week terms:

MICHAELMAS TERM

Sunday 12 October 2008 to Saturday 6 December 2008

HILARY TERM

Sunday 18 January 2009 to Saturday 14 March 2009

TRINITY TERM

Sunday 26 April 2009 to Saturday 20 June 2009.

Some supervision normally continues during vacations. Lectures and classes are often arranged in Week 9 of Michaelmas and Hilary Terms and the deadline for submission of assessed work may be in Week 9. You are therefore expected to remain in Oxford at that time.

MSc students should remain in Oxford during the summer for 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 Proctors may excuse you from part of statutable residence. Students living out of college must reside within twenty-five miles of Carfax.

Dispensation from the residence limits will only be granted by the Proctors in very exceptional circumstances. Applications need to be made through your college. 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

Amber Tomas is the MSc Course Coordinator and makes the day-to-day arrangements for the course. There is also a formally constituted MSc Supervisory Committee.

MSc Course Coordinator	Amber Tomas	tomas@stats.ox.ac.uk
Head of Department of Statistics	Professor Colin McDiarmid	cmcd@stats.ox.ac.uk
Chair of MSc Supervisory Committee	Professor Bob Griffiths	griff@stats.ox.ac.uk
Director of Graduate Studies and Chair of Graduate Liaison Committee	Dr Peter Clifford	clifford@stats.ox.ac.uk
Director of Studies	Dr Neil Laws	laws@stats.ox.ac.uk
Academic Administrator	Jan Boylan	boylan@stats.ox.ac.uk

Lecture courses

Lectures for the MSc/Diploma in Applied Statistics are shown on timetables available from the Department at the beginning of each term. Students should discuss with their supervisor which 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. A few lectures shared with other courses are held in the Mathematical Institute. Problem sheets are provided on the core topics and classes may be arranged for each topic to discuss the problems. Please remember to turn your Mobile Phones OFF when entering the Lecture Room. Food and drink may not be taken into the lecture or seminar room. When the lecture and seminar rooms are being used please remember to keep the noise levels DOWN in the entrance hall and common room.

Lecture Synopses

Examination Paper I *Principles of Statistical Analysis*

Statistical Methods (18 hrs)

- Visualization: plots including histograms, box plots, scatterplots, scatterplot matrices, parallel coordinate plots, mosaicplots.
- Summary statistics and goodness-of-fit tests. One- and two-sample examples. t and F distributions. [All revision.] Robustness and robust summaries.
- Concepts of simulation: simple simulation experiments.
- Linear regression, including multiple linear regression. Associated inference problems. Regression diagnostics and resistant regression. Classical applications to ANOVA. Model selection.
- Logistic regression and Poisson regression. Proportional-odds logistic regression.
- Introduction to the design of experiments, observational studies and sampling methods.

Relevant books

Nolan, D.A. & Speed, T. (2000) *Stat Labs: Mathematical Statistics Through Applications*. Springer.
Ramsey, F.L. & Schafer, D.W. (2002) *The Statistical Sleuth. A Course in Methods of Data*. Duxbury Press.

Venables, W.N. & Ripley, B.D. (2002) *Modern Applied Statistics with S*. Springer.

Breslow, N. E. & Day, N.E.(1980). *Statistical methods in cancer research, vol. 1, The analysis of case-control studies*. Lyon: IARC.

Breslow, N. E. & Day, N.E.(1983). *Statistical methods in cancer research, vol. 2, The analysis of cohort studies*. Lyon: IARC.

Cox, D.R. (1958). *Planning of experiments*. New York: Wiley.

Cox, D. R. & Reid, N. (2000). *The theory of the design of experiments*. London: Chapman and Hall.

Rosenbaum, S. (2002). *Observational studies*. 2nd ed. New York. Springer

Thompson, M. E. (1997). *The theory of sample surveys*. London: Chapman and Hall.

Thompson, S.K. (1992). *Sampling*. New York: Wiley.

Statistical Theory (16 hrs)

- Introduction. Likelihood and sufficiency; ancillarity and conditioning.
- Point estimation: bias and variance, information and efficiency. Maximum likelihood estimation.
- Hypothesis testing: pure tests, significance level. Simple hypotheses, Neyman-Pearson Lemma. Tests for composite hypotheses.
- Interval estimation: confidence regions and prediction regions.
- Asymptotic properties: maximum likelihood estimates; generalized likelihood ratio tests; likelihood confidence regions.
- Bayesian Statistics: Interpretations of probability; the Bayesian paradigm: models, exchangeability and sufficient statistics: prior distributions, conjugate and noninformative priors: posterior summaries.
- Decision theoretic framework: point estimation, loss function, model comparisons.

Relevant books

- Bernardo, J.M. and Smith, A.F.M. (2000) *Bayesian Theory*. Wiley
- Casella, G. and Berger, R.L. (2002) *Statistical Inference*. Second Edition. Thomson Learning.
- Cox, D.R. and Hinkley, D.V. (1974) *Theoretical Statistics*. Chapman & Hall.
- Garthwaite, P.H., Joliffe, I.T. and Jones, B. (2002) *Statistical Inference*. Second Edition. Oxford University Press.
- Leonard, T. and Hsu, J.S.J. (2001) *Bayesian Methods*. Cambridge University Press.
- Lindgren, B.W. (1993) *Statistical Theory*. 4th edition. Chapman and Hall
- O'Hagan, A. (2004) *Kendall's Advanced Theory of Statistics. Vol. 2B, Bayesian Inference*. Edward Arnold
- Young, G.A. and Smith, R.L. (2005) *Essential of Statistical Inference*, Cambridge University Press.

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

- Venables, W.N. and Ripley, B.D. (2002) *Modern Applied Statistics with S*. Springer. (Chapter 13).
- Klein, J.P. & Moeschberger, M.L. (1997) *Survival Analysis*. Springer.
- Collett, D.A. (1994) *Modelling Survival Data in Medical Research*. Chapman & Hall.

Time series (8 hrs)

- Nature of time series. Linear models, time domain and frequency domain models, autocorrelation and spectral density functions, filters. Model identification, estimation, forecasting. State space models. Nonlinear models.

Relevant books

At an appropriately introductory level, and as alternatives:

- Brockwell and Davis (2002). *Introduction to Time Series and Forecasting*. Springer.
- Brockwell, P.J. and Davis, R.A. (1991). *Time Series: Theory and methods*. 2nd edition. Springer.
- Diggle, P.J. (1990) *Time Series*. Clarendon Press. (Chapters 1, 2, 3, 4, 6 and 7.)
- Harvey, A.C. (1993) *Time Series Models 2nd Edition*. Harrister Wheatsheaf.
- Shumway and Stoffer (2000). *Time Series Analysis and Its Applications*. Springer.
- R.L. Smith (2001) *Time Series*. At <http://www.stat.unc.edu/faculty/rs/s133/s133.html>
- Venables and Ripley (2002). *Modern Applied Statistics with S*. Springer.

Examination Paper II *Further Statistical Methodology*

Core Topics

Multivariate Analysis (3 hrs)

- Graphical methods. Brush and Spin, Projection pursuit.
- Principal components and factor analysis.
- Discrete methods, including correspondence analysis.

Relevant books

Gower, G.C & Hand D. J. (1996) *Biplots*, Chapman & Hall/ CRC Press

Krzanowski, W.J. (1988) *Principles of Multivariate Analysis*. OUP.

Venables, W.N. & Ripley, B.D. (2002) *Modern Applied Statistics with S*. Springer. (Chapter 11).

Computer-Intensive Statistics (6 hours)

- Density estimation: kernel density estimation: bandwidth selection.
- Non-parametric regression: smoothing/splines; Generalized Additive Models, other methods; software.
- Parametric Frequentist Monte Carlo Inference; Monte Carlo tests and confidence intervals; parametric bootstrap methods.
- The non-parametric bootstrap: sampling from the e.d.f.; estimating the mean and standard errors; bias reduction: the jack-knife.

Relevant Books

Davison, A, C & Hinkley, D V (1997) *Bootstrap Method on their Application*. Cambridge

Efron, B. and Tibshirani, R.J. (1993) *An Introduction to the Bootstrap*. Chapman & Hall.

Green, P.J. and Silverman, B.W. (1994) *Nonparametric Regression and Generalized Linear Models*. Chap&Hall.

Hastie, T.J. and Tibshirani, R.J. (1990) *Generalized Additive Models*. Chapman & Hall.

Simonoff, J.S. (1996) *Smoothing Methods in Statistics*. Springer.

Venables W.N. & Ripley B.D. (2002) *Modern Applied Statistics with S*. Springer

Further Statistical Methods (10 hours)

- Models for hierarchical ('multi-level') and longitudinal data.
- Latent variable models (including factor analysis and latent class analysis)
- Methods for dealing with missing data.

Relevant books

Agresti, A. *Categorical Data Analysis*. (2nd ed). Wiley, 2002.

Bartholomew, D.J. & Knott, M. *Latent Variable Models and Factor Analysis* (2nd ed). Arnold, 1999.

Diggle, P.J., Heagerty, P., Liang, K-Y, Zeger, S.L. *Analysis of Longitudinal Data* OUP, 2002.

Gelman, A., & Hill, J. *Data Analysis using Regression and Multilevel/Hierarchical Models*. CUP, 2006.

Little, R.J.A. & Rubin, D.B. *Statistical Analysis with Missing Data*. (2nd ed). Wiley 2002.

Snijders, T.A.B. & Bosker, R.J. *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. Sage, 1999.

MCMC and Applied Bayesian Statistics (6hrs)

- Principles of Bayesian modelling.
- Non-conjugate models and inference via MCMC.
- Techniques for MCMC sampling: the Gibbs sampler and Metropolis-Hastings algorithm. Efficiency considerations when using MCMC methods. Output analysis and tests for convergence.
- Examples of MCMC for hierarchical linear and random effects models using WinBUGS.

Relevant books

Gelman, A., Carlin, J.B., Stern, H.S., and Rubin, D.B. (1995) *Bayesian Data Analysis*. Chapman & Hall.

Robert, C.P. and Casella, G. (1999). *Monte Carlo Statistical Methods*. Springer-Verlag, New York.

Gilks, W., Richardson, S. and Spiegelhalter, W.R. eds (1995) *Markov Chain Monte Carlo in Practice*. Chapman & Hall. (see chapters 1, 2 and 8).

Optional Courses

Stochastic Models in Mathematical Genetics (8 hrs)

- Evolutionary models in Mathematical Genetics:
- The Wright-Fisher model. The Genealogical Markov chain describing the number ancestors back in time of a collection of genes.
- 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.
- The infinitely-many-sites model of mutations on DNA sequences. Gene trees as perfect phylogenies describing the mutation history of a sample of DNA sequences. Graph theoretic constructions and characterizations of gene trees from DNA sequence variation. Gusfield's construction algorithm of a tree from DNA sequences. Examples of gene trees from data. The probability distribution of a gene tree.

Relevant books

R Durrett, *Probability Models for DNA Sequence Evolution*, Springer (2002).

W. J. Ewens, *Mathematical Population Genetics*, 2nd ed, Springer (2004).

J. R. Norris, *Markov Chains*, Cambridge University Press (1999).

M. Slatkin and M. Veuille, *Modern Developments in Theoretical Population Genetics*, Oxford Biology (2002).

S. Tavaré and O. Zeitouni, *Lectures on Probability Theory and Statistics, Ecole d'Eté de Probabilités de Saint-Flour XXXI -- 2001*, Lecture Notes in Mathematics 1837. Springer (2004).

Infectious Diseases (6 hrs)

- Models for the spread of infectious diseases in large populations and small groups. Bovine spongiform encephalopathy (BSE), new variant Creutzfeldt-Jakob disease (vCJD), foot-and-mouth disease (FMD) and SARS will be examined as case studies.

Relevant books and papers:

- Anderson RM, Donnelly CA, Ferguson NM, *et al.* *Transmission dynamics and epidemiology of BSE in British Cattle.* Nature 382, 779-788, 1996.
- Anderson, R.M. and May, RM. *Infectious Diseases of Humans: Dynamics and Control.* OUP, 1991.
- Bailey, N.T.J. *The Elements of Stochastic Processes with Applications to the Natural Sciences.* Wiley. (Chapters 1-8, 12)
- Bailey, N.T.J. (1975) *The Mathematical Theory of Infectious Diseases and its Applications.* Griffin,
- Donnelly CA and Ferguson NM. *Statistical Aspects of BSE and vCJD: Models for Epidemics,* Monographs on Statistics and Applied Probability, Chapman & Hall/CRC Press, 1999.
- Donnelly CA, Ghani AC, Leung GM, *et al.* *Epidemiological determinants of the spread of the causal agent of severe acute respiratory syndrome in Hong Kong.* Lancet 361, 1761–1766, 2003.
- Ferguson NM, Donnelly CA and Anderson RM. *The foot-and-mouth epidemic in Great Britain: Pattern of spread and impact of interventions.* Science, 292, 1155-1160, 2001.
- Ferguson NM, Donnelly CA and Anderson RM. *Transmission intensity and the impact of control policies on the foot and mouth disease epidemic in Great Britain.* Nature 413, 542-548, 2001.
- Ghani AC, Ferguson NM, Donnelly CA and Anderson RM. *Predicted vCJD mortality in Great Britain.* Nature 406, 583-584, 2000.

Statistical Data Mining (12 hrs)

- Fundamentals of pattern recognition, machine learning and data mining.
- Exploratory methods: principal components analysis, biplots, independent component analysis, multidimensional scaling.
- Cluster Analysis: K-means, hierarchical methods, vector quantisation, self-organising maps.
- Linear discriminant analysis, logistic discrimination, linear separation and perceptrons.
- Classification trees. Splitting criteria, existence of pruning sequences. V-fold cross-validation.
- Feed-forward neural networks. Universal approximation properties, back-propagation, training algorithms, assessment of fit.

Reading

- C. Bishop, *Neural Networks for Pattern Recognition*, Oxford UP (1995).
- D. Hand, H. Mannila, P. Smyth, *Principles of Data Mining*, MIT Press (2001).
- I. H. Witten and E. Franke, *Data Mining. Practical Machine Learning Tools and Techniques with Java Implementations*, Morgan Kaufmann (2000).
- B. D. Ripley, *Pattern Recognition and Neural Networks*, Cambridge UP (1996).

Combinatorial Optimisation (12 hrs)

Combinatorial Optimisation (CO) is concerned with methods for finding the maximum or minimum of a function defined on a finite set, which has some structure, for example arising from a network. The network might be of airports; or oil pipelines; or classes, class-rooms and teachers; or telecommunications links; or represent the possible sequences in which a set of tasks may be carried out. The problem then is to devise schedules, time-tables, flows, or priority rules which in some sense optimise the system. Manufacturing industry presents many such problems, where operational researchers are often responsible for their solution. Computers have also been a strong stimulus to developments in this field, both by presenting design problems for hardware and software, and as the means whereby CO algorithms may be implemented.

The main mathematical ideas underlying this course are some basic graph theory, and duality and complementary slackness in linear programming. None of these are prerequisites.

- Minimum spanning trees and shortest paths
- Dynamic programming and scheduling
- Matchings in bipartite graphs and assignment problems
- Maximum flows in networks, and minimum cost flows

Relevant books

Cook, W.J., Cunningham, W.H., Pulleyblank, W.R. & Schrijver, A. *Combinatorial Optimization*. Wiley, 1998.

French, S. *Sequencing and Scheduling*, Ellis Horwood, 1982 (Chapter 3 and Sections 5.1-5.3.) Out of print but in college libraries.

Lawler, E. L. *Combinatorial Optimisation, Networks and Matroids*, Dover 2001.

McDiarmid, C.J.H. *Lecture Notes on Combinatorial Optimisation*, Mathematical Institute: an updated version will be available at <http://www.stats.ox.ac.uk/~cmcd/combopt/>

Wilson, R.J. *Introduction to Graph Theory*, 4th edition, Addison-Wesley Longman, 1996 (Sections 1, 2, 3, 5, 9, 22, 25 - 29.)

Actuarial Science (16 hours)

- Term structure of interest rates, deterministic and stochastic interest rate models
- Effect of changes in interest rates: effective duration, convexity, immunisation
- No arbitrage models: valuation and hedging
- Life insurance: simple life insurance products via life-time distributions and lifetables, premiums and reserves

Relevant books and papers:

Subject 102 [CT1]: *Financial Mathematics*. Core reading . Faculty & Institute of Actuaries

McCutcheon, J.J. and Scott, W.F., *An Introduction to the Mathematics of Finance*, Heinemann 1986

H.U. Gerber: *Life Insurance Mathematics*. 3rd edition, Springer (1997)

N.L. Bowers et al: *Actuarial mathematics*. 2nd edition, Society of Actuaries (1997)

These are available from the Publications Unit, Institute of Actuaries, 4 Worcester Street, Oxford OX1 2AW.

Practical Classes

There are weekly practical classes, almost all of which will use R. These are **compulsory** and all students **must** attend them. The classes take place in the MSc Computing Laboratory in 1 South Parks Road.

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 assignment and the assessment of four specific pieces of coursework. Declaration of authorship forms must be completed for each piece of coursework submitted. **Students should pay particular attention to the University's policies on plagiarism including collusion <http://www.admin.ox.ac.uk/epsc/plagiarism> .**

A smaller Computing Laboratory is available in room 2.201 in 2 South Parks Road.

Non-examined Material

There will be a number of 'skills' courses which will not be formally examined. These will include:

Case Studies

Statistical critique
Presentation skills

Statistical Computing

Introduction to LaTeX.
Introduction to programming, with examples in C.

R programming

There will be an *Introduction to R* in week 1 Michaelmas Term followed by a course on *R Programming* with about 8 further lectures during MT and HT.

Synopsis:

Michaelmas term:
Installing, starting and basic use of R.
Representation of numbers in computers, representation and rounding errors.
Manipulating and plotting numeric and character data.
Simulation and optimization.

Hilary term:

Writing, debugging and tuning R functions.
More on character data.

A more detailed syllabus will be available at the week 1 introductory lecture.

Report Writing

Structure of reports.
Presentation graphics.
Principles of typography.

Links to further sources of skills and study resources can be found on the website at http://www.stats.ox.ac.uk/current_students/msc_and_diploma_in_applied_statistics

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 research workers from outside Oxford, and 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. The Mathematical Genetics and Bioinformatics group hold seminars at 4.30 pm on Tuesday afternoons in the Henry Wellcome Building of Gene Function. MSc students are welcome to attend. See http://www.stats.ox.ac.uk/news_and_events

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

Course material and timetables

Timetables and specific course material can be found on the relevant section of the Departmental website at http://www.stats.ox.ac.uk/current_students/msc_and_diploma_in_applied_statistics.

The programme specifications for the MSc and Diploma in Applied Statistics can also be found there.

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 Courses by Term

	<u>Michaelmas</u>	<u>Hilary</u>	<u>Trinity (Weeks 1-4)</u>
Paper I	Statistical Methods Statistical Theory Survival Analysis	Time Series	
Paper II core		Further Statistical Methods Computer Intensive Statistics MCMC and Bayesian Analysis Multivariate Analysis	
Paper II optional	Actuarial Science	Actuarial Science Statistical Data Mining Stochastic Models in Mathematical Genetics Combinatorial Optimisation Infectious Diseases	
Skills	Introduction to LaTeX R Programming Case Studies	R Programming	Report Writing

General Books

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

Modern Applied Statistics with S, WN Venables and BD Ripley, Springer, 2002

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

Probability and Statistics, Mark Schervish and Morris Degroot, Pearson Higher Education, 2001
- Covers both probability and statistics

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

Mathematical methods for Science Students (Stephenson)
- General mathematics

A Guide to LaTeX, Helmut Kopka and Patrick Daly, Pearson Professional Education, 2003

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 fortnightly 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 important to stress 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.

In addition, 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.

The supervisor is responsible for writing a report on each student each term. He/she will usually discuss this report with the student. It is sent to the University and also to the student's college. Unsatisfactory progress will usually lead to discussion with appropriate college officers.

It is regarded as 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.

In the rare event of any dissatisfaction, a student should contact the Director of Graduate Studies for a change of 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 the last written examination to the dissertation submission date on 15 September but project supervisors regularly encourage students to do preparatory background reading on their projects before the examinations.

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 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. Non-examined courses are provided to give students sufficient background, and students are expected to be able to write S-PLUS/ R functions or program in C 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 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 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:

Criterion	Weighting
STRUCTURE <ul style="list-style-type: none"> • Understanding of aims • Quality of general approach 	10%
LITERATURE AND THEORY <ul style="list-style-type: none"> • Quality of scrutiny of literature • Understanding of relevant theory 	10%
EXPOSITION <ul style="list-style-type: none"> • Quality of exposition of source materials • Quality of elaborations of source materials • Quality of mathematical argument 	20%
METHODOLOGY <ul style="list-style-type: none"> • Appropriateness of choice of techniques • Quality of data-collection and/or handling • Quality of computer work • Accuracy 	30%
CONCLUSIONS <ul style="list-style-type: none"> • Appropriateness of conclusions drawn • Understanding of implications and limitations 	20%
PRESENTATION <ul style="list-style-type: none"> • Clarity of style • Quality of diagrams and tables • Proper referencing to the literature 	10%

The length of the dissertation should be no more than is required to present the project in a satisfactory manner and in case **no more than 12,000 words**. Inordinately lengthy dissertations may lose marks.

Two copies of the dissertation are to be submitted to the Examination Schools, High Street, **by noon** on a date to be announced by Examinations Schools, no later than 15 September 2009. Details of submitting work to the Examination Schools can be found at <http://www.admin.ox.ac.uk/schools/oxonly/submissions/index.shtml>

A declaration of authorship must also be completed and submitted with the dissertation. Students should pay particular attention to the University's policies on plagiarism
<http://www.admin.ox.ac.uk/epsc/plagiarism>

**MSc in Applied Statistics
DECLARATION OF AUTHORSHIP**

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

Name (in capitals):

Candidate number:

College (in capitals):

Supervisor:

Title of dissertation (in capitals):

Please tick to confirm the following:

I am aware of the University's disciplinary regulations concerning conduct in examinations and, in particular, of the regulations on 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 quoted or paraphrased material and referenced all sources.

I have acknowledged appropriately any assistance I have received in addition to that provided by my supervisor/adviser.

I have not sought assistance from any professional agency.

I agree to retain an electronic version of the work and to make it available on request from the Chair of Examiners should this be required to check for plagiarism.

Candidate's signature:

Date:

.....

3. Examination Procedures

There are two written examination papers:

Paper I	Principles of statistical analysis	JAST 7120
Paper II	Further statistical methodology	JAST 7121

The written examination is usually held in the Examination Schools in the High Street during the early part of week 7 or 8, Trinity Term. The dates and times will be available from College Offices or at <http://www.admin.ox.ac.uk/schools/oxonly/timetables/index.shtml> nearer the time. Academic dress with *subfusc* clothing is worn. During the June written examinations, electronic calculators may be used, subject to certain conditions set out in the *Examination Regulations*. *The Cambridge Elementary Statistical Tables* will also be provided. The examiners may summon any candidate for an oral examination, but rarely do so.

The results for Diploma students will be known after the Examiner's Meeting which takes place soon a few weeks after the examination. The results for MSc students are known in mid-October following submission of the dissertation in mid-September; although an indication of the quality of the examination performance will be made available to students after the June Examiners' Meeting. The examiners may award a Diploma to an MSc candidate whose work is good enough for the Diploma but not for the MSc.

Students' names and results will be included on the Pass List that will be displayed in the Examination Schools and in Colleges and Departments. An Individual Results Notification showing the overall result will be sent to each student once the Pass list is published. Students wishing their name to be omitted from the publicly displayed Pass List should send an email to exam.queries@admin.ox.ac.uk. Students will then receive their Individual Results Notification in the usual way.

Past examination papers can be found online at <http://missun29.offices.ox.ac.uk/pls/oxam/main>. Copies of solutions to examination papers from 2004 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.

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 are only available in October of the year in which the resit examination was held.

Course regulations and syllabus

The regulations for the course are reproduced later in this handbook and can be found in the University of Oxford *Examination Regulations*, which are obtainable from colleges or at <http://www.admin.ox.ac.uk/examregs/>. 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.

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.

University of Oxford Examination Regulations 2008 [Extract]

Regulations for the Degree of Master of Science by Coursework

Applied Statistics

1. The Divisional Board of Mathematical, Physical and Life Sciences shall elect for the supervision of a course a standing committee which shall have power to arrange lectures and other instruction.
2. Candidates shall follow for at least three terms a course of instruction in Statistics, and will, when entering their name for the examination, be required to produce from their society a certificate that they are doing so.
3. The examination will consist of:
 - (i) a written examination consisting of two papers on the syllabus described in the schedule;
 - (ii) a dissertation on a subject selected in consultation with the supervisor and approved by the chairman of the committee.
4. Candidates must submit to the chairman of the committee by the end of Hilary Term in the year in which they enter the examination, the title and a brief statement of the form and scope of their dissertation, together with the name of a person who has agreed to act as their supervisor during the preparation of the dissertation.
5. Two typewritten or printed copies of the dissertation must be sent out not later than noon on 15 September in the year in which the written examination is taken, to the M.Sc. examiners (Applied Statistics), c/o the Clerk of the Schools, Examination Schools, High Street, Oxford. The examiners may retain on copy of the dissertation of each candidate who passes the examination for deposit in an appropriate departmental library.
6. Each candidate will be expected to have displayed evidence of the ability to apply statistical methods to real data.

The examiners will take into account the results of an assessment of the ability to apply statistical methods to real data organised by the supervisory committee. The supervisory committee will be responsible for notifying the candidates of the arrangements for the assessment, and for forwarding the assessed material to the chairman of the examiners before the end of Trinity Term in the year in which the assessment was made.
7. In the written examination the examiners will permit the use of any hand-held pocket calculators subject to the conditions set out under the heading 'Use of calculators in examinations' in the *Special Regulations concerning Examinations*.
8. The examiners may also examine any candidate viva voce.
9. The examiners may award a distinction for excellence in the whole examination.
10. If it is the opinion of the examiners that the work done by the candidate is not of sufficient merit to qualify for the degree of M.Sc., but it is nevertheless of sufficient merit to qualify for the Diploma in Applied Statistics, the candidate shall be given the option of re-taking the M.Sc. 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 M.Sc., the examiners will specify which of the components of the course may or must be redone.

SCHEDULE

Paper 1: Principles of statistical analysis

Statistical distribution theory; statistical inference; statistical methods.

Paper 2: Further statistical methodology

Topics in statistical methodology chosen from a list approved by the standing committee and published in the Course Handbook by the beginning of Michaelmas Term of the academic year in which the written examination is to be taken.

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 (Dr Peter Clifford) 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 tutor 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/>).

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/ps/staff/codes/air.shtml>, 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/ps/staff/codes/pid.shtml>

Plagiarism

<http://www.admin.ox.ac.uk/epsc/plagiarism>

Definition

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 a series of sophisticated 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

Students are always welcome at any time to discuss academic or non-academic matters with the Head of Department or any other senior member of the Department.

The Departmental adviser on matters of harassment is Mrs Christine Stone (room 1.208). The Disability contact is Mrs Jan Boylan (room 1.101).

Other sources of advice and help include:

Disability Office <http://www.admin.ox.ac.uk/eop/disab/students.shtml>

Student Counselling Service <http://www.admin.ox.ac.uk/shw/counserv.shtml>

Oxford University Student Union Advice Service <http://www.ousu.org/welfare/student-advice-service/>

Nightline <http://users.ox.ac.uk/%7Enightln/>

The University Code of Discipline can be found at <http://www.admin.ox.ac.uk/statutes/352-051.shtml> . This applies to behaviour on any University or College premises.

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 English which run during term time. These have a small registration fee for graduate students.

Details are available at <http://www.lang.ox.ac.uk/eas/>

The Careers Service

The University Careers Service can be found at 56 Banbury Road with a website at www.careers.ox.ac.uk . It is a free service for all Oxford University students including postgraduates. 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.

Student representation

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.admin.ox.ac.uk/gso/forms/> .

After the course

At the end of the course, students should ensure that they have completed a Departmental leaver's form, returned all library books and locker keys and paid any photocopying charges. Students should contact their supervisor if a reference is required.

5. Departmental Facilities

Computing

Students have access to all the public computing facilities of the Department of Statistics. The principal computing resource for the MSc is the PC laboratories. Students will use these to run statistical packages such as S-PLUS, R and SAS as well as to prepare documents and reports. Laser 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 Oxford University Computing Services may be of interest to students <http://www.oucs.ox.ac.uk/>. Project work in the summer will normally require the use of a computer.

Dissertations may be prepared on the department's computers, but only after seeking permission from the Computing Manager; a charge may be levied. General laser printing use is monitored and the Department reserves the right to charge for excessive usage.

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 along with details of how to use your laptop on the Oxford Wireless LAN.

Libraries

The Department of Statistics has an extensive library of books and journals. 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 South Parks Road, and also the Social Studies Library, Manor Road, (applications relating to economics). Details on training sessions on using the Radcliffe Science Library can be found at http://www.ouls.ox.ac.uk/rsl/making_the_most_of_the_rsl. The Physical Sciences Librarian with responsibility for the statistics collection in the RSL is Ljilja Ristic (email ljilja.ristic@bodley.ox.ac.uk)

College libraries may also be useful although in general, access will be 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>

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 OLIS, the University's on-line catalogue. OLIS can be accessed through the library terminal.

The library sections are as follows:

- 100. White spine labels
Main statistics lending section
- 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.
- 800. Red
MSc dissertations and DPhil theses (reference only)

Periodicals are unmarked and are for reference only.

The books in each of the main sections are in alphabetical order of the first author or editor.

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 even further.

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 the Telnet OPAC system available in the library. Further details can be found at <http://www.lib.ox.ac.uk/olis/documentation/opac3.html#reserve> . Alternatively email the reservation request to lib@stats.ox.ac.uk

6. Loan periods

Books can be taken out for one week and then can be renewed on a further three occasions unless recalled by the library.

Loans may be renewed either by checking them out again, by using the library system 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.

- Smoking, eating and drinking are **not permitted** in the library.
- Personal belongings should not be left unattended in the library at any time. Any such items will be removed. The Department will not be responsible for personal belongings which are stolen or damaged.
- The use of mobile phones is not permitted in the library.
- 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 photocopiers.
- 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.
- The library computers must not be unplugged or switched off.
- Please be considerate to other users and keep noise to a minimum. The library should not be used as a place for group discussion.

Department of Statistics - General Information

Access to the Department's Buildings

The Department's buildings at 1 and 2 South Parks Road 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 1 – 2 pm Monday to 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 South Parks Road, we ask all users of the buildings to help with security and other aspects: leaving secure windows and doors of study and public areas; not to leave the doors open or unlocked in the communal computing areas; following the security notices posted in the buildings; reporting any infringements, lighting failures; reporting any problems needing the attention of the surveyors or cleaners, 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 South Parks Road is not to be used by students other than disabled students.

Computing Manager

The Computing Manager will ask to see all personal electrical or computing equipment brought on to the premises. Any use of the Department's fixed computing/electrical facilities must be arranged first with the Computing Manager or designated representatives, ithelp@stats.ox.ac.uk

Department Library

The library is located on the first floor in 1 South Parks Road. All new readers must register with the Academic Administrator in room 1.101. All items lodged in the Library may be photocopied (within copyright law).

Photocopying

Individual photocopying accounts are set up at the beginning of the year and access to the machine on the ground floor in 1 South Parks Road is then available by means of a personal 4-digit code. Photocopies are charged at 5p per copy. This is recorded on your photocopying account, which is settled on leaving the department at the end of the MSc course. Copyright law applies.

Post

Post slots 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. Some colleges issue a 'credit type' card for making calls and these are also accepted by our network.

Lockers

A limited number of lockers are available in 1 South Parks Road. A deposit is charged for the key to the lockers; this is refundable on leaving the department. If you lose a key the deposit is void and another deposit will be charged for the replacement key.

Kitchen facilities and Common Rooms

Facilities and provisions for making tea and coffee are available in the kitchen in 1 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. You will need to provide your own mug. Please keep the kitchen tidy. If reheating food in the microwave, it would be appreciated if you would bear in mind that some smells may offend.

Common rooms are available for taking refreshments and there are two daily newspapers available. It would be appreciated if newspapers were not removed from the Common Rooms.

Lost property

Items which have been found in 1 and 2 South Parks Road are lodged with the Receptionist 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 (9999). 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:

In recent years theft of personal items and departmental equipment has occurred. 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. For an ambulance phone (9)999.

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

Administrative Staff

1 South Parks Road:

Judith McIntyre	<i>Senior Administrator</i>	Room 1.303	mcintyre@stats.ox.ac.uk
Jennie McKenzie	<i>Finance Officer</i>	Room 1.101	mckenzie@stats.ox.ac.uk
Jan Boylan	<i>Academic Administrator</i>	Room 1.101	boylan@stats.ox.ac.uk
Christine Stone	<i>Professorial PA</i>	Room 1.208	cstone@stats.ox.ac.uk
Emma Bodger	<i>Receptionist/ Administrative Assistant</i>	Room 1.109	bodger@stats.ox.ac.uk

Oxford Centre for Gene Function:

Maddy Mitchell	<i>Administrative Officer/ PA and Group Secretary</i>	Room 40.80	mitchell@stats.ox.ac.uk
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Peter Medawar Building for Pathogen Research:

Beverley Lane	<i>Administrative Assistant</i>	Room 50.28	lane@stats.ox.ac.uk
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Computing Staff

2 South Parks Road: Ashley Woltering Susan Hutchinson David del Campo Hill Saffron Greenwood	<i>Computing Manager</i> <i>Computing Consultant</i> <i>Computing Officer</i> <i>Computing Officer</i>	Room 2.108 Room 2.109 Room 2.109 Room 2.107	Please direct all IT enquiries to ithelp@stats.ox.ac.uk
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