DEPARTMENT OF
STATISTICS

MSc and Postgraduate Diploma in Statistical Science

2025-2026 Student Handbook

This handbook applies to students starting the MSc or Postgraduate Diploma in Statistical Science in Michaelmas Term 2025. The information in this handbook may be different for students starting in other years.

The Examination Regulations relating to this course are available at MSc regulations and PGDip regulations. If there is a conflict between information in this handbook and the Examination Regulations, then you should follow the Examination Regulations. If you have any concerns, please contact the Academic Administrator of the Department of Statistics on academic.administrator@stats.ox.ac.uk.

The information in this handbook is accurate as at September 2025, however it may be necessary for changes to be made in certain circumstances, as explained at www.graduate.ox.ac.uk/coursechanges. If such changes are made, the Department will publish a new version of this handbook, together with a list of the changes and students will be informed.

Version 1.1

1. Introduction

1.1 Welcome and introduction

We welcome you to the Department of Statistics and our MSc programme in Statistical Science. The programme is demanding, but we are here to help and want to see you succeed. All the best for your academic year 2025-2026.

Professor Frank Windmeijer, Head of Department

This handbook is designed to help you understand the course structure for the MSc and PG Diploma in Statistical Science, including assessment, information on supervision, key contacts, facilities, and where you can go if you need support.

Other key sources of information

- Timetables, announcements, student handbook, course materials and other course documents are found on Canvas using the Single Sign On login.
- Examination conventions will also be found on Canvas.
- General University information and for students and access to Student Self-Service can be found via the University's Student website.
- College handbooks are available on the websites of each college.

1.2 Course Contacts

. The MSc Course Director makes the day-to-day decisions for the course. There is also a formally constituted departmental Teaching Committee, which oversees the programme.

MSc Course Director	Prof. François Caron	caron@stats.ox.ac.uk
MSc Course Administrator	Hannah Harrison	hannah.harrison@stats.ox.ac.uk
Head of Department	Prof. Frank Windmeijer	frank.windmeijer@stats.ox.ac.uk
Director of Studies, Chair of Teaching Committee	Dr Neil Laws	laws@stats.ox.ac.uk
Director of Graduate Studies	Prof. Christina Goldschmidt	christina.goldschmidt@stats.ox.ac.uk
Academic Administrator, Disability Coordinator	Jonathan Whyman	academic.administrator@stats.ox.ac.uk
Statistics Library	Hannah Harrison	lib@stats.ox.ac.uk
Statistics Reception	Emma Bodger	reception@stats.ox.ac.uk
IT support		ithelp@stats.ox.ac.uk

1.3 Your student e-mail

You will be allocated an Oxford e-mail account. Important information will be sent to this account and you are expected to check this account **at least once per working day**.

1.4 Term dates

In the first term, teaching begins on Monday 13 October. Teaching is concentrated in three eight-week terms (weeks 1-8).

MICHAELMAS TERM – Sunday 12 October to Saturday 6 December 2025

For Michaelmas Term, you should be in Oxford for week 0 (5-11 October) for induction sessions and in week 9 (7-13 December) as there will be a submission deadline on Wednesday in week 9.

HILARY TERM – Sunday 18 January to Saturday 14 March 2026

For Hilary term, you should be in Oxford for week 0 (11-17 January) as there will be a compulsory test called a Collection and for weeks 9 and 10 (15-28 March) as there will be a submission deadline on Wednesday week 10.

TRINITY TERM – Sunday 26 April to Saturday 20 June 2026

After the end of Trinity Term, MSc students should remain in Oxford throughout the summer to continue work on their dissertation project, although a holiday may be taken during this period.

1.5 Residency requirements

Postgraduate taught students must adhere to the following rules:

- Limits: reside within 25 miles of Carfax Tower, unless given special permission to work away from Oxford for a period of time (typically agreed and approved by the department).
- Terms: be in residence for at least six weeks of each term of the course.

The Proctors may excuse a student from residing within the specified limits, if there are good reasons why this is not possible. Students should discuss this first with their college. More information is available on the residency requirements page.

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.

1.6 Assessment Dates

- Practical 0 (marked with feedback) – submission date: 12 noon, Wednesday, 12 November 2025 (MT week 5).

- Practical 1 (assessed) – submission date: 12 noon, Wednesday, 10 December 2025 (MT week 9).
- Collection Exam (marked, not part of MSc assessment) – provisional date: 10am, Thursday, 15 January 2026 (HT week 0).
- Statistical Programming Practical (assessed) – submission date: 12 noon, Wednesday, 14 January 2026 (HT week 0).
- Practical 2 (group assessed) – submission date: 12 noon, Wednesday, 25 March 2026 (HT week 10).
- Provisional date for start of exams: Monday 1 June 2026 (TT week 6).
- Dissertation (assessed, MSc only) – 12 noon, Monday 14 September 2026.

The results of the Collection Exam and Practical 0 do not count towards the final degree mark but are to help students and their supervisors assess progress. A pass mark is required in the Statistical Programming assignment but it does not count towards the weighted average degree mark. You are expected to complete these assessments and attend the Collection Exam.

1.7 Locations

Lectures, classes and practical sessions will be held in out teaching rooms in the lower ground floor of the Department of Statistics, 24-19 St Giles'. Lectures will be recorded, but classes and practical sessions will not be recorded. It is expected that you will attend all lectures, classes and practical sessions in-person if you can. To find us you can use the University's searchable map.

Mobile phones should be turned off when entering the teaching rooms. Food and drink may not be taken into the lecture rooms or the IT suite.

2. Course Information

2.1 Overview

The Master of Science by Coursework (MSc) in Statistical Science is a 12-month full-time programme running from October to September. It provides a broad high-level training in applied and computational statistics, statistical machine learning, and the fundamental principles of statistical inference. Training is delivered through mathematically-demanding lectures and problems classes, hands-on practical sessions in the computing laboratory, report writing and dissertation supervision.

The 9-month Postgraduate (PG) Diploma in Statistical Science programme runs from October to June. It has no dissertation and so greater weight is given to the basic parts of the course than in the case of the MSc.

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

The MSc in Statistical Science and the PG Diploma in Statistical Science are awards at Frameworks for Higher Education Qualifications (FHEQ) level 7. The University does not assign credit values for the majority of its awards.

The subject benchmark statement for this course is Mathematics, Statistics and Operational Research.

2.2 Course aims

The aims of the programme are that students:

- learn a range of statistical methods, especially modern, computer-intensive methods;
- are able to choose and adapt appropriate statistical and computational methods when faced with a problem of data analysis;
- are able to implement the analysis on a computer;
- develop the skills to communicate their results clearly and succinctly.

2.3 Intended learning outcomes

- Lectures provide information for students to gain a full understanding of the general theory and practice of statistical analysis at an advanced level appropriate for MSc study. Lectures are provided on core topics which cover some of the fundamentals of statistics, statistical theory, a wide range of statistical methods, R programming; core material also covers modern computational aspects of statistics through lectures on a range of further statistical methods and statistical data mining and machine learning.

- Optional topics are provided on further statistical methodology and applications including for example courses in statistical genetics, advanced simulation methods and advanced machine learning.
- Non-examinable skills support lectures are provided on report writing and LaTeX document production.
- Recommended reading is provided for all modules of the course in advance in this student handbook
- Course assignments are provided to further understanding and extend knowledge in modules, together with example classes covering problem solving.
- Practical sessions enable students to undertake practical statistical data analysis that complement lectures. They enable students to learn statistical computing skills using modern statistical software such as R, and to learn to write a report on the statistical analysis of data.
- Working on a dissertation enables MSc students to undertake an in-depth study of a statistical problem involving modelling, computing and data analysis, usually involving a body of real data. It enables students to learn to undertake directed research, report writing and communication of research results.

2.4 Course structure

For **MSc students**, the overall assessment structure is based on:

- written examinations on eight courses, which must include SB1, SB2,1 and SB2.2;
- assessed practical work;
- a dissertation.

For **Postgraduate Diploma students** the overall assessment is based on:

- written examinations on eight courses, which must include SB1, SB2.1 and SB2.2;
- assessed practical work.

For both the MSc and the Diploma, candidates can pass, pass with merit, pass with distinction, or fail.

Examination Papers – Core Courses

- SB1 Applied and Computational Statistics (double unit)
- SB2.1 Foundations of Statistical Inference
- SB2.2 Statistical Machine Learning

Examination Papers – Optional Courses

- SC1 Stochastic Models in Mathematical Genetics
- SC2 Probability and Statistics for Network Analysis
- SC4 Advanced Topics in Statistical Machine Learning
- SC5 Advanced Simulation Methods
- SC6 Graphical Models
- SC7 Bayes Methods
- SC10 Algorithmic Foundations of Learning
- SC11 Climate Statistics

Assessed Practical Work

There will be a number of assessed, computer-based practical assignments in Michaelmas and Hilary Term. One practical will be assessed by group work in Hilary Term. This includes a practical on Statistical Programming, for which a submission and passing mark is required to pass the MSc/PG Diploma but the mark does not contribute to the weighted average of the MSc.

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 mid-June to dissertation submission date, which is noon on the second Monday in September (14 September 2026).

Collection

A ‘Collection’ – a test on core subjects studied in Michaelmas Term – will take place in the Department in week 0 of Hilary Term (provisionally 15 January 2026). The Collection Exam will be taken under exam conditions in the Large Lecture Theatre of the Department of Statistics. You are expected to attend the Collection, except if you have extenuating circumstances, such as illness, on the date. This does not form part of the final assessment for the course but is to help students and their supervisors assess progress. The collection is marked and solutions are available after the test. There is no penalty for non-attendance.

Research-Teaching Nexus

The impact of research on teaching in this department may take many forms: tutors and lecturers include their own data 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.

2.5 Timetables and lectures

Lecture and class timetables for the MSc/PG Diploma in Statistical Science are available on Canvas on the main MSc in Statistical Science page 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 the lecture courses by further independent reading from book suggested by lecturers or supervisors.

Lecture courses by term

	Michaelmas Term	**Hilary Term**
Core courses	SB1.1 Applied Statistics SB2.1 Foundations of Statistical Inference Statistical Programming	SB1.2 Computational Statistics SB2.2 Statistical Machine Learning
Optional courses	SC1 Stochastic Models in Mathematical Genetics SC2 Probability and Statistics for Network Analysis SC6 Graphical Models SC7 Bayes Methods SC10 Algorithmic Foundations of Learning	SC4 Advanced Topics in Statistical Machine Learning SC5 Advanced Simulation Methods SC11 Climate Statistics
Skills	Introduction to LaTeX Case Studies in Statistical Science	Collection Exam Case Studies in Statistical Science

2.6 Course synopses – Core Courses

Prerequisites

Where the synopses refer to prerequisites, material for these courses can be found in the following locations:

Mathematical Institute Course Materials

Full course materials are available for the courses listed in prerequisites. If no materials are available for the current year, use the drop down and find the previous year.

- A8 Probability – found in Undergraduate, Part A, Michaelmas.
- A9 Statistics – found in Undergraduate, Part A, Hilary.

- Introduction to Complex Numbers – found in Undergraduate, Prelims, Michaelmas.
- M5 Fourier Series and PDEs – found in Undergraduate, Prelims, Hilary.

Statistics Course Materials

Synopses of A12 and SB3.1 are available via this link.

All other courses are part of the MSc in Statistical Science.

SB1 Applied and Computational Statistics

Recommended Prerequisites

A8 Probability and A9 Statistics.

Aims and Objectives

The course aims to develop the theory of statistical methods, and also to introduce students to the analysis of data using a statistical package. The main topics are simulation-based inference, practical aspects of linear models, logistic regression and generalised linear models, and computer-intensive methods.

SB1.1 Applied Statistics – 13 lectures (MT)

Synopsis

The normal linear model: use of matrices, least squares and maximum likelihood estimation, normal equations, distribution theory for the normal model, hypothesis tests and confidence intervals.

Practical aspects of linear models and analysis of variance: multiple regression, categorical variables and interactions, blocks and treatments, orthogonality, model selection (including AIC, but not the derivation of AIC), fit criteria, use of residuals, outliers, leverage, model interpretation.

Normal linear mixed models, hierarchical models.

Generalised Linear Models: logistic regression, linear exponential families and generalised linear models, scale parameter, link functions, canonical link. Maximum likelihood fitting. Iteratively reweighted least squares. Asymptotic theory: statement and applications to inference, analysis of deviance, model checking, residuals.

Reading

A. C. Davison, *Statistical Models*, CUP, 2003.

J.J. Faraway, *Linear Models with R*, Chapman and Hall, 2005.

A. J. Dobson and A.G Barnett, *An Introduction to Generalized Linear Models*, Chapman and Hall, 2008.

J.J. Faraway, *Extending the Linear Model with R: Generalized Linear, Mixed Effects and Nonparametric Regression Models*, Chapman and Hall, 2006.

Further Reading

F. L. Ramsey and D. W. Schafer, *The Statistical Sleuth, A Course in Methods of Data Analysis*, 2nd edition, Duxbury, Second edition 2002, Third edition 2013.

SB1.2 Computational Statistics – 13 lectures (HT)

Synopsis

Smoothing methods (local polynomials). Nonparametric inference (bandwidth and Generalised Cross Validation).

Multivariate smoothers and Generalised Additive Models.

Inference using simulation methods. Monte-Carlo Tests. Permutation tests. Rank statistics.

Bootstrapping.

Hidden Markov Models: specification. Forward-backward algorithm. Kalman filter.

Reading

J. D. Gibbons, *Nonparametric Statistical Inference*, Marcel Dekker, 1985, pp 1-193, 273- 290.

G.H. Givens and J.A. Hoeting, *Computational Statistics*, 2nd edition, Wiley, 2012.

G. James, D. Witten, T. Hastie, R. Tibshirani, *An Introduction to Statistical Learning*, Springer, 2013.

R. H. Randles and D. A. Wolfe, *Introduction to the Theory of Nonparametric Statistics*, Wiley 1979, pp 1-322.

L. Wasserman, *All of Nonparametric Statistics*, Springer, 2005.

L. Wasserman, *All of Statistics*, Springer, 2004.

Further Reading

A.C. Davison and D.V. Hinkley, *Bootstrap Methods and their Application,* CUP, 1997.

C.R. Shalizi, *Advanced Data Analysis from an Elementary Point of View*, http://www.stat.cmu.edu/~cshalizi/ADAfaEPoV/.

SB2.1 Foundations of Statistical Inference – 16 Lectures (MT)

Recommended Prerequisites

A8 Probability and A9 Statistics.

Aims and Objectives

Understanding how data can be interpreted in the context of a statistical model. Working knowledge and understanding of key-elements of model-based statistical inference, including awareness of similarities, relationships and differences between Bayesian and frequentist approaches.

Synopsis

Exponential families: Curved and linear exponential families; canonical parametrization; likelihood equations. Sufficiency: Factorization theorem; sufficiency in exponential families.

Frequentist estimation: unbiasedness; method of moments; the Cramer-Rao information inequality; Rao-Blackwell theorem: Lehmann-Scheffé Theorem and Rao-Blackwellization; Statement of complete sufficiency for Exponential families.

The Bayesian paradigm: likelihood principal; subjective probability; prior to posterior analysis; asymptotic normality; conjugacy; examples from exponential families. Choice of prior distribution: proper and improper priors; Jeffreys' and maximum entropy priors. Hierarchical Bayes models.

Decision theory: risk function; Minimax rules, Bayes rules. Point estimators and admissibility of Bayes rules. The James-Stein estimator, shrinkage estimators and Empirical Bayes. Hypothesis testing as decision problem.

Reading

P. H. Garthwaite, I. T. Jolliffe and Byron Jones, *Statistical Inference,* 2nd edition, Oxford University Press, 2002.

G.A. Young and R.L. Smith, *Essentials of Statistical Inference*, Cambridge University Press, 2005.

T. Leonard and J.S.J. Hsu, *Bayesian Methods*, Cambridge University Press, 2005.

Further Reading

D. Barber, *Bayes Reasoning and Machine Learning*, Cambridge University Press, 2012.

D. R. Cox, *Principles of Statistical Inference*, Cambridge University Press, 2006.

H. Liero and S Zwanzig*, Introduction to the Theory of Statistical Inference*, CRC Press, 2012.

SB2.2 Statistical Machine Learning -16 lectures (Core in HT)

Recommended Prerequisites

A8 Probability and A9 Statistics. SB2.1 Foundations of Statistical Inference is useful but not essential.

Aims and Objectives

Machine learning studies methods that can automatically detect patterns in data, and then use these patterns to predict future data or other outcomes of interest. It is widely used across many scientific and engineering disciplines.

This course covers statistical fundamentals of machine learning, with a focus on supervised learning and empirical risk minimisation. Both generative and

discriminative learning frameworks are discussed and a variety of widely used classification and regression algorithms are overviewed.

Synopsis

Introduction to unsupervised learning. Principle component analysis, dimensionality reduction, singular value decomposition. K-means clustering.

Fundamentals of statistical learning for supervised learning: loss function, risk, Bayes classifier. Plug-in estimators and empirical risk minimisation. Generative and discriminative methods.

Generative classifiers: Linear and quadratic discriminant analysis, naïve Bayes.

Further concepts in statistical machine learning: feature expansion, overfitting and bias-variance trade-off, double descent phenomenon and overparameterisation; cross-validation, performance measures, ROC curves.

Optimisation for Machine learning: gradient descent and stochastic gradient descent, early stopping.

Linear classifiers: least-squares, perceptron, logistic regression.

K- nearest neighbours.

Decision trees, bagging, random forests, boosting.

Neural networks and deep learning.

Reading

C. Bishop, *Pattern Recognition and Machine Learning*, Springer, 2007.

T. Hastie, R. Tibshirani, J Friedman, *Elements of Statistical Learning*, Springer, 2009.

K. Murphy, *Machine Learning: a Probabilistic Perspective*, MIT Press, 2012.

Further Reading

B. D. Ripley, *Pattern Recognition and Neural Networks*, Cambridge University Press, 1996.

G. James, D. Witten, T. Hastie, R. Tibshirani, *An Introduction to Statistical Learning*, Springer, 2013.

Statistical Programming – 8 sessions of 2 hours (MT)

This course will be taught in 8 lectures, with approximately the first hour as a lecture and the second as a computer practical.

Synopsis

Introduction to statistical computing. Basic use of R. Basic data types.

Functions. Graphics.

I/O. Apply family of functions.

Tidyverse.

Testing, debugging, benchmarking, profiling code.

Parallel computing. Computational complexity.

Literate programming. Reproducible research. Version control.

R packages. Rcpp. Workflow managers.

Reading

Wickham, Hadley et. al., *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*, Second edition, O'Reilly, 2023.

Wickham, Hadley and Bryan, Jennifer, *R Packages: Organize, Test, Document, and Share your Code*, O-Reilly, 2023.

Wickham, Hadley and Sievert, Carson, *ggplot2: Elegant Graphics for Data Analysis*, Second edition, Springer, 2016.

Wickham, Hadley and Sievert, Carson, *ggplot2: Elegant Graphics for Data Analysis*, Third edition, Springer, available online: https://ggplot2-book.org/.

Wickham, Hadley, *Advanced R*, CRC Press, 2015.

2.7 Course Synopses – Optional Courses

SC1 Stochastic Models in Mathematical Genetics – 16 lectures (MT)

Recommended Prerequisites

A8 Probability. SB3.1 Applied Probability would be helpful.

Aims and Objectives

The aim of the lectures is to introduce modern stochastic models in mathematical population genetics and give examples of real-world applications of these models. Stochastic and graph theoretic properties of coalescent and genealogical trees are studied in the first eight lectures. Diffusion processes and extensions to model additional key biological phenomena are studied in the second eight lectures.

Synopsis

Evolutionary models in Mathematical Genetics: The Wright-Fisher model. The Genealogical Markov chain describing the number ancestors back in time of a collection of DNA sequences.

The Coalescent process describing the stochastic behaviour of the ancestral tree of a collection of DNA sequences. Mutations on ancestral lineages in a coalescent tree. 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 DNA sequences 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.

Modelling biological forces in Population Genetics: Recombination. The effect of recombination on genealogies. Detecting recombination events under the infinitely-many-sites model. Hudson's algorithm. Haplotype bounds on recombination events. Modelling recombination in the Wright-Fisher model. The coalescent process with recombination: the ancestral recombination graph. Properties of the ancestral recombination graph.

Introduction to diffusion theory. Tracking mutations forward in time in the Wright-Fisher model. Modelling the frequency of a neutral mutation in the population via a diffusion process limit. The generator of a diffusion process with two allelic types. The probability of fixation of a mutation. Genic selection. Extension of results from neutral to selection case. Behaviour of selected mutations.

Reading

R. Durrett, *Probability Models for DNA Sequence Evolution*, Springer, 2008.

A.Etheridge, *Some Mathematical Models from Population Genetics. Ecole d'Eté de Probabilities de Saint-Flour XXXIX-2009*, Lecture Notes in Mathematics, 2012.

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 Probabilities de Saint-Flour XXXI - 2001*, Lecture Notes in Mathematics 1837, Springer, 2004.

SC2 Probability and Statistics for Network Analysis – 14 lectures (MT)

For this course, two lectures and two hours of classes are replaced with two practical classes.

Recommended Prerequisites

A8 Probability and A9 Statistics.

Aims and Objectives

Many data come in the form of networks, for example friendship data and protein-protein interaction data. As the data usually cannot be modelled using simple independence assumptions, their statistical analysis provides many challenges. The

course will give and introduction to the main problems and the main statistical techniques used in this field. The techniques are applicable to a wide range of complex problems. The statistical analysis benefits from insights which stem from probabilistic modelling, and the course will combine both aspects.

Synopsis

Exploratory analysis of networks. The need for network summaries. Degree distribution, clustering coefficient, shortest path length. Motifs.

Probabilistic models: Bernoulli random graphs, geometric random graphs, preferential attachment models, small world networks, inhomogeneous random graphs, exponential random graphs.

Small subgraphs: Stein's method for normal and Poisson approximation. Branching process approximations, threshold behaviour, shortest path between two vertices.

Statistical analysis of networks: Sampling from networks. Parameter estimation for models. Inferring edges in networks. Network comparison. A brief look at community detection.

Reading

R. Durrett, *Random Graph Dynamics*, Cambridge University Press, 2007.

E.D Kolaczyk and G. Csádi, *Statistical Analysis of Network Data with R*, Springer, 2014.

M. Newman, *Networks,* Oxford University Press.

SC4 Advanced Topics in Statistical Machine Learning – 16 lectures (HT)

Recommended Prerequisites

The course requires a good level of mathematical maturity. Students are expected to be familiar with core concepts in statistics (regression models, bias-variance trade off, Bayesian inference), probability (multivariate distributions, conditioning) and linear algebra (matrix-vector operations, eigenvalues and eigenvectors). Previous exposure to machine learning (empirical risk minimisation, dimensionality reduction, overfitting regularisation) is highly recommended.

Students would also benefit from being familiar with the material covered in SB2.1 Foundations of Statistical Inference and SB2.2 Statistical Machine Learning.

Aims and Objectives

Machine learning (ML) is a core technology widely used across the sciences, engineering, and society, enabling pattern discovery and accurate prediction from large datasets. This course focuses on statistical machine learning, highlighting the probabilistic foundations that underpin modern ML approaches, including artificial intelligence (AI). The course studies both unsupervised and supervised learning. Several advanced and state-of-the-art topics, such as large language models (LLMs), are covered in detail. The course also covers computational considerations of machine learning algorithms and how they can scale to large datasets.

Synopsis

Empirical risk minimisation. Loss functions. Generalisation. Over- and under-fitting. Regularisation.

Support vector machines.

Kernel methods and reproducing kernel Hilbert spaces. Representer theorem. Representation of probabilities in RKHS.

Probabilistic and Bayesian machine learning: fundamentals of the Bayesian approach; variational inference, amortized variational inference.

Gaussian processes.

Deep learning fundamentals: neural networks; automatic differentiation; stochastic gradient descent.

Large language models: transformers, pre-training, scaling-laws, post-training evaluation.

Reading

C. Bishop, *Pattern Recognition and Machine Learning*, Springer, 2007.

K. Murphy, *Machine Learning: A Probabilistic Perspective*, MIT Press, 2012.

Further Reading

T. Hastie, R. Tibshirani, J Friedman, *Elements of Statistical Learning*, Springer, 2009.

Scikit-learn: *Machine Learning in Python*, Pedregosa et al., JMLR 12, pp2835-2830, 2011, http://scikit-learn.org/stable/tutorial/.

SC5 Advanced Simulation Methods – 16 lectures (Option in HT)

Recommended Prerequisites

The course requires a good level of mathematical maturity as well as some statistical intuition and background knowledge to motivate the course. Students are expected to be familiar with core concepts from probability (conditional probability, conditional densities, properties of conditional expectations, basic inequalities such as Markov's, Chebyshev's and Cauchy-Schwarz's, modes of convergence), basic limit theorems from probability in particular the strong law of large numbers and the central limit theorem, Markov chains, aperiodicity, irreducibility, stationary distributions, reversibility and convergence. Most of these concepts are covered in courses offered in the Statistics department, in particular prelims probability, A8 probability and SB3.1 Applied Probability.

Familiarity with basic Monte Carlo methods will be helpful, as for example covered in A12 Simulation and Statistical Programming.

Some familiarity with concepts from Bayesian inference such as posterior distributions will be useful in order to understand the motivation behind the material of the course.

Aims and Objectives

The aim of the lectures is to introduce modern simulation methods. 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.

MCMC methods: elements of discrete-time general state-space Markov chains theory, Metropolis-Hastings algorithm.

Advanced MCMC methods: Gibbs sampling, slice sampling, tempering/annealing, Hamiltonian (or Hybrid) Monte Carlo, Pseudo-marginal MCMC.

Sequential importance sampling.

SMC methods: nonlinear filtering.

Reading

C.P. Robert and G. Casella, *Monte Carlo Statistical Methods*, 2nd edition, Springer-Verlag, 2004.

Further Reading

J.S. Liu, *Monte Carlo Strategies in Scientific Computing*, Springer-Verlag, 2001

SC6 Graphical Models – 16 lectures (Option in MT)

Recommended Prerequisites

The basics of Markov chains (in particular, conditional independence) from A8 Probability is assumed. Likelihood theory, contingency tables, and likelihood-ratio tests are also important; this is covered in A9 Statistics. Knowledge of exponential families and linear models (as covered in SB2.1 Foundations of Statistical Inference and SB1.1 Applied Statistics) would be useful, but is not essential.

Aims and Objectives

This course will give an overview of the use of graphical models as a tool for statistical inference. Graphical models relate the structure of a graph to the structure of a multivariate probability distribution, usually via a factorization of the distribution or conditional independence constraints. This has two broad uses: first, conditional independence can provide vast savings in computational effort, both in terms of the representation of large multivariate models and in performing inference with them, this makes graphical models very popular for dealing with big data problems. Second, conditional independence can be used as a tool to discover hidden

structure in data, such as that relating to the direction of causality or to unobserved processes. As such, graphical models are widely used as causal models in genetics, medicine, epidemiology, statistical physics, economics, the social sciences and elsewhere.

Students will develop and understanding of the use of conditional independence and graphical structures for dealing with multivariate statistical models. They will appreciate how this is applied to causal modelling, and to computation in large-scale statistical problems.

Synopsis

- Independence, conditional independence, graphoid axioms.
- Exponential families, mean and canonical parameterizations, moment matching; contingency tables, log-linear models.
- Undirected graphs, cliques, paths; factorization and Markov properties, Hammersley-Clifford Theorem (statement only).
- Trees, cycles, chords, decomposability, triangulation, running intersection property. Maximum likelihood in decomposable models, iterative proportional fitting.
- The multivariate Gaussian distribution and Gaussian graphical models.
- Directed acyclic graphs, factorization. Paths, d-separation, moralization. Ancestral sets and sub-models. Decomposable models as intersection of directed and undirected models.
- Running intersection property, Junction trees; message passing, computation of marginal and conditional probabilities, introduction of evidence.
- Causal models, linear structural equations, interventions, the trek rule.
- Average causal effects, adjustment, valid adjustment sets, forbidden projection, and optimal adjustment.

Reading

1. S.L. Lauritzen, Graphical Models, Oxford University Press, 1996.

2. D. Koller and N. Friedman, Probabilistic Graphical Models: Principles and Techniques, MIT Press, 2009.

3. J. Pearl, Causality, third edition, Cambridge, 2013.

4. M.J. Wainwright and M.I. Jordan, Graphical Models, Exponential Families, and Variational Inference, Foundations and Trends in Machine Learning, 2008.

5. A. Agresti. Categorical Data Analysis, 3rd Edition, John Wiley & Sons, 2013.

SC7 Bayes Methods – 16 lectures (Option in HT)

Recommended Prerequisites

SB2.1 Foundations of Statistical Inference is desirable, of which 6 lectures on Bayesian inference, decision theory and hypothesis testing with loss functions are assumed knowledge. A12 Simulation and Statistical Programming desirable.

Synopsis

Theory: Decision-theoretic foundations, Savage axioms, Prior elicitation, exchangeability. Bayesian Non-Parametric (BNP) methods, the Dirichlet process and the Chinese Restaurant Process. Asymptotics, and information criteria.

Computational methods: Bayesian inference via MCMC, Estimation of marginal likelihood, Approximate Bayesian Computation and intractable likelihoods, reversible jump MCMC.

Case studies: extended understanding of prior elicitation, BNP methods and asymptotics through a small number of substantial examples. Examples to further illustrate building statistical models, model choice, model averaging and model assessment, and the use of Monte Carlo methods of inference.

Reading

C.P. Robert, *The Bayesian Choice: From Decision-Theoretic Foundations to Computational Implementation*, 2nd edition, Springer, 2001.

Further Reading

A. Gelman et. al., *Bayesian Data Analysis*, 3rd edition, Boca Raton, Florida: CRC Press, 2014.

P. Hoff, *A First Course in Bayesian Statistical Methods*, Springer, 2010.

Morris H. DeGroot, *Optimal Statistical Decisions*, Wiley Classics Library, 2004.

SC10 Algorithmic Foundations of Learning – 16 lectures (Option in MT)

Recommended Prerequisites

The course requires a good level of mathematical maturity, and assumes familiarity with concepts from introductory-level analysis, probability theory and linear algebra.

Students from nonmathematical backgrounds interested in taking the course would benefit from carefully studying chapters 2 and 3 of Lattimore & Szepesvári 2020 ahead of time.

Previous exposure to machine learning or statistical theory is not required.

Aims and Objectives

The course provides a brief introduction to the main areas of research in the theory of machine learning, and to the tools used to carry out such research.

Synopsis

High-dimensional probability: moment-based concentration inequalities; covering, packing and chaining; the martingale method; concentration via nonnegative supermartingales. Examples in random vectors, matrices and processes.

Statistical learning theory: empirical risk minimisation; learning via uniform convergence; slow & fast rates; Rademacher complexity & VC theory; minimax lower bounds. Examples in linear, generalised-linear and kernel-based predictors.

Optimisation, online learning & reinforcement learning: gradient descent algorithm and variants; exponential weights algorithm; boosting. Explore-the- commit & upper-confidence-bounds algorithms for stochastic bandits; basics of planning in Markov Decision processes.

Reading

Shai Shalev-Shwartz and Shai Ben-David. *Understanding Machine Learning: From Theory to Algorithms*. Cambridge University Press, 2014.

Martin J. Wainwright. *High-Dimensional Statistics. A Non-Asymptotic Viewpoint*. Cambridge University Press. 2019.

Orabona F. A modern introduction to online learning. Lecture notes available online at https://arxiv.org/pdf/1912.13213. 2019.

Tor Lattimore and Csaba Szepesvári. *Bandit Algorithms*. Book available online (https://tor-lattimore.com/downloads/book/book.pdf), 2019.

SC11 Climate Statistics – 16 lectures (Option in HT)

Recommended Prerequisites

As this course is directed at providing a foundation for understanding the statistical principles actually used in modern climate science, the methods described will be diverse. It is to be expected that most students will have some relevant gaps in their background knowledge, which may be made up by supplemental reading; there will be some supplemental materials specifically made available for the course, and other teaching materials suggested in the lecture notes.

At a minimum, students will need a grounding in probability and statistical theory at least on the level of part A probability and statistics, and underlying mathematical tools such as first-year-level analysis and complex variables. There will be heavy use of Linear Algebra, assuming proficiency on the level of Oxford's first-year courses.

Familiarity with more sophisticated statistical methods on the level of SB1.1 Applied Statistics and SB1.2 Computational Statistics will be extremely helpful. In particular, familiarity with linear models and principles of model selection, and some prior understanding of generalised linear and mixed models will be assumed. Some familiarity with principles of simulation-based inference will also be assumed.

Fourier series will be a major topic, and will be covered from the beginning in the lectures, but some prior knowledge (on the level of the first-year course Fourier

series and PDEs) would be helpful. At a minimum, working with Fourier series requires being comfortable with complex numbers, on the level of the first-year 2-lecture Oxford course Introduction to Complex Numbers (not complex analysis).

Aims and Objectives

This course aims to teach the fundamentals of some statistical concepts and techniques that are relevant for understanding and carrying out research in climate science. It will introduce the main varieties of climate data, demonstrate how they can be analysed with these techniques, and explain core concepts of climate science, showing how advances in the field have paralleled advances in statistical methodology.

The main topics covered are core statistical methods, presented in the context of their applications to climate science. The topics are: the nature of climate data; time series (time domain and frequency domain); multivariate analysis, multivariate decomposition methods (PCA, CCA, related issues), and extreme values; predictive statistics.

Computing

Techniques of data analysis in R will be taught, and students will be expected to engage with issues of data analysis. Students are encouraged to familiarise themselves with the basic syntax of R, so that they can interpret the code examples included in the lecture notes. The problem sheets will include computing questions, which may in principle be done in any programming language, though solutions will be provided only in R. Students will not be examined on writing code, but on the interpretation of computational outputs.

Synopsis

Introduction:

- History and background of climate science;
- Varieties of climate data and climate models;
- Exploratory Data analysis and nonparametric smoothing.

Predictive statistics:

- Review of model selection for climate models;
- Data assimilation;
- Forecast skill and verification;
- Ensemble forecasting and probabilistic prediction.

Time series:

- ARIMA models in the time domain;
- Spurious correlation and regression techniques for time series;
- Spectral methods;

- Time-frequency representations: Windowing and wavelets.

Multivariate analysis:

- Multivariate regression;
- Principal Components Analysis and Empirical Orthogonal Functions;
- Canonical Correlation Analysis;
- Predictable Components Analysis.

Extreme values:

- Basic theory of extreme value distributions;
- Convergence theorems (without detailed proofs) for block maxima and Peaks over Threshold;
- Inference for the generalised extreme value distribution;
- Attribution of extreme events

Reading

Statistical Methods for Climate Scientists, Timothy M. Delsole and Michael K. Tippett.

Time Series Analysis and its Applications, Robert H. Shumway and David S. Stoffer.

Further Reading

The Discovery of Global Warming, Spencer Weart.

Introduction to Time Series and Forecasting, P.J. Brockwell and R.A. Davis.

Time series: Theory and methods, P.J. Brockwell and R.A. Davis.

Forecasting: Principles and practice, R. Hyndman.

“Quantification and interpretation of the climate variability record.” Anna S. von der Heydt, et al. Global and Planetary Change 197 (2021): 103399.

Probability: Theory and Examples, R. Durrett.

Non-examinable material

There are a number of courses which will not be formally examined:

- Case Studies in Statistical Science
- Introduction to LaTeX
- Dissertation preparation

Case Studies in Statistical Science

Students will take turns presenting a summary and critique of a piece of published statistical reasoning in weekly case-studies sessions. This will be run in the format of a journal club moderated by a member of faculty. Students will receive feedback on their presentations both in public (through questions and comments of a technical nature) and informally at the end in a short informal ‘debrief’. As well as providing an opportunity for students to develop and practice their presenting skills, the presentations will help students revisit some of the material that has been covered in lectures and expose them to current issues in statistical research.

3. Teaching and Learning

3.1 Organisation of teaching and learning

The courses offered are listed in Section 2.4, and the terms in which these courses are given are in Section 2.5. The syllabus for these courses, together with the number of lectures, assessed and non-assessed practicals, are given in Section 2.6. Most courses have lectures, associated supervised practical sessions and/or problems classes. In addition, students will be expected to undertake reading, and work on practical preparation and problem sheets.

You should do all of the core courses in Michaelmas and Hilary Terms, plus 4 optional courses, spread over the two terms. The core courses are “core” in the sense that you are required to do exams and/or assessed practical assignments on these courses, and the material in the core courses can be assumed known in other courses and for projects. You can attend additional optional courses if you wish. But studying an additional course seriously would be considerable extra work so you should consider this carefully when planning your work (you may want to discuss this point with your supervisor). Most students are expected to do 5 courses in Michaelmas Term and 4 courses in Hilary Term.

Information about practicals, problems classes, supervision, and projects, are given in Sections 3.2-3.5 below.

If you have issues with teaching or supervision, please raise these as soon as possible so that they can be addressed promptly. Details on whom to contact are provided in the section on complaints and appeals.

3.2 Practical classes and assessments

Practical classes are held on some Fridays during the term. **The practical classes are compulsory and all students must attend them.** They will take place in LG.02.

Most classes will use R. The practical assessment is made up of the assessment of specific pieces of coursework in Michaelmas and Hilary Terms. The assignments are normally based on exercises done in the practical classes. The submission times of the assessed practicals will be made available on the timetable and on the Canvas calendar. For each practical report that you submit, you should include the R code that you used as an appendix to your report. Sample solutions will be provided for each practical, whether assessed or not. Exercise sheets will be made available to the students in advance of each practical session.

The assessed practical assignments listed below will be released at noon on the Wednesday before the associated practical session.

Practical 0 is an individual mock practical held in week four of Michaelmas term, which you will submit and receive feedback on before undertaking any assessed practical. The feedback will be similar to the form on page 24 below and there will also be an in-person feedback session.

Practical 1 is the first assessed practical held in Michaelmas term week 8 and submitted in week 9. The feedback will be similar to the form on page 24 below and there will also be an in-person feedback session.

Practical 2 is a group assessed practical held in week 4 of Hilary Term and submitted in week 10. There will be no feedback on this practical assessment as that is the final practical assessment. Instead, your overall assessed practical mark will be published (together with your exam marks) following the June/early July examiners' meeting.

The Statistical Programming practical is an individual practical assignment held in Michaelmas Term week 6 and submitted in Hilary Term week 1. The feedback will be similar to the form on page 24 below. This is a pass/fail assignment, separate from Practical 1 and 2.

For the group assessed practical, students will be allowed to choose their own groups. If possible, groups should be formed of four students. Because students will form their own groups, in exceptional circumstances smaller groups may 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.

The practical reports have a word limit of 2000 words. This word limit is on the main body of the report. Equations, tables, figures, captions, appendices to your report and computer code do not contribute to the word count. Students should ensure that the practical, including the code, is their own work.

All assessed practicals must be submitted via Inspera. Students will be given instruction on how to do this at the beginning of Michaelmas Term. Students must keep a copy of the practical. Practicals will be blind marked and students will be issued with a **practical identification number** to use on their reports instead of names. Students should pay particular attention to the University's policies on plagiarism including collusion and will be required to complete a declaration of authorship for each piece of coursework submitted.

Interim marks, given for the assessed practical assignments in Michaelmas and Hilary terms, are provisional and may be subject to further moderation. These interim marks are not numeric. Each piece of work will be given an overall level which will be one of "distinction", "good pass", "pass", "borderline pass/fail", or "fail". The assessed practicals contribute 25% to the overall mark for the MSc and 33.3% for the PG Diploma. Penalties will be imposed for late submission of practical reports without permission of the proctors.

Where permission for late submission has not been granted for Practical 1 and 2, the normal penalties based on a submission deadline of Wednesday 12 noon are as follows:

Lateness	**Mark penalty**
Up to 2 hours, i.e. up to Wednesday 14:00	1 mark
2-5 hours, i.e. up to Wednesday 17:00	5 marks
5-24 hours, i.e. up to Thursday 12:00	10 marks
24-48 hours, i.e. up to Friday 12:00	15 marks
48-52 hours, i.e. up to Friday 17:00	20 marks
Over 53 hours, i.e. after Friday 17:00	25 marks

The mark penalty above would be deducted from the practical mark, when the practical mark is expressed out of 25. For example, if a student submits a practical report 4 hours late, and that report in itself is worth 17 marks (out of 25), then the penalty above means that s/he loses 5 marks and so the final mark is 12 (out of 25). The final mark cannot be negative, it is truncated at zero if necessary.

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

Where permission for late submission has not been granted for the Statistical Programming Practical, the normal penalties based on a submission deadline of Wednesday 12 noon are as follows:

Lateness	**Cumulative mark penalty**
Up to 4 hours, i.e. up to Wednesday 4pm	1 mark
4-24 hours, i.e. up to Thursday 12 noon	10 marks
24-48 hours, i.e. up to Friday 12 noon	20 marks
48-72 hours, i.e. up to Saturday 12 noon	30 marks
72 hours -14 days	35 marks
More than 14 days	Fail

The mark penalty above would be deducted from a practical mark out of 100. For example, if a student submits a practical 22 hours late, and that practical is work 65 marks, then the 10-mark penalty above leans that the final mark is 55. The final mark awarded after applications of the penalty cannot be below 0.

MSc/PG Diploma in Statistical Science - Practical Feedback Form

Student practical number:

Practical Title:

[Instructions: tick one box for each of 1-5. The middle box corresponds to satisfactory work, while boxes to the right indicate stronger work and boxes to the left indicate weaker work.]

1. Writing style

Unclear, difficult to read	☐	☐	☐	☐	☐	Clear, flowing, easy to read

2. Statistical Analysis

Weak, invalid	☐	☐	☐	☐	☐	Strong, valid

3 Answering the report question

Aspects of the question ignored	☐	☐	☐	☐	☐	Question answered in full

4. Conclusions

No observations	☐	☐	☐	☐	☐	Limitations of current analysis clearly brought out

5. Figures and tables

No meaning, wrong size, missing labels or captions	☐	☐	☐	☐	☐	Meaningful, correct size, good labels and captions

6. R code

Missing R code, inconsistencies	☐	☐	☐	☐	☐	Well presented and correct R code

Overall Assessment:

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

Individual Feedback:

3.3 Problems classes

All courses, except Statistical Programming, have problems classes. Problems classes are based around exercise sheets set by the lecturer and provide an opportunity to discuss solutions to some problems and to ask questions. Like non-assessed practical assignments, the exercises on problem sheets are also non-assessed.

3.4 Supervision

Each student is allocated a departmental supervisor. Your supervisor will arrange regular meetings with you during the year to discuss your progress. Supervisors will normally be supervising several students and it is usual that supervisors will see their students together as a group. Students must attend scheduled meetings with their supervisor. It is essential to keep these appointments and if, for good reason, you cannot make a meeting then you must let your supervisor know the situation in advance, for example by phone or email.

Supervisors might meet with their students up to four times a term. Each student should see his or her supervisor at the beginning of each term to arrange convenient times. Supervisors may be able to provide general academic advice, but it is important to note that supervisors are not expected to be expert in every subject covered by the MSc. For specific queries about a particular course the main contact point is the lecturer, not the departmental supervisor.

In addition to providing general advice, supervisors may be able to advise students about where to look (within Oxford, or outside) to find an answer to a question. If the question concerns some general aspect about being a student in Oxford, then although the supervisor may not be able to answer the question themselves, they may be able to advise if there is somewhere in the University, or in the student's College, that could help.

In the rare event of any dissatisfaction with supervision, a student should contact the Course Director or the Director of Studies to discuss changing supervisor.

3.5 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 June 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. You can find the research interests of our staff in their personal webpages, which can be accessed through the departmental website.

Students are encouraged to propose their own projects. Students wishing to do this should start getting in touch with prospective supervisors at the beginning of, or

early, in Hilary Term. Sometime during Hilary Term, perhaps about the middle of the term, students wishing to suggest their own project will need to 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 their preferences. This list may be available at the end of Hilary Term or early in Trinity Term. Students cannot be guaranteed to be allocated to a particular project on the list, the department will do its best to match student preferences to the projects available. All preferences submitted by the deadline for submission of preferences will be treated equally.

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 departmental supervisor.

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.

The project is 25% of the MSc, it corresponds to approximately 3 months of full-time work, so is unlikely to be compatible with any summer internship (unless the internship involves doing MSc project work and has been approved in advance).

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 projects of a computational nature in which the supervisor agrees **in advance** to provide specialist software development and possible access to other resources.

In general, students will be assumed to be able to complete their dissertation projects comfortably in the allotted time using a single machine in the IT Teaching Suite (LG.02) or their own computer. If not, it may be possible to use computing resources from the supervisor, supervisor's research group, a free cloud-based compute resource (e.g. Google Colab) or the Department's small research facility (SRF).

A limited amount of SRF time is available, so it is not guaranteed that all requests to use the SRF can be granted. Requests to use the SRF should be included in project proposals.

The total amount of SRF time available for MSc projects is approximately 50,000 GPU hours and 350,000 CPU hours. The maximum amount available per student is

10% of this. If a student’s usage exceeds 10%, then their usage may need to be capped.

Students may examine selected dissertations from previous years on the course Canvas site.

The dissertation should be typed and in PDF format.

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.

Dissertation markers must be able to see how key methods in your dissertation were implemented, if they wish. If you have a fairly small amount of code then the suggestion is to include your code as an appendix to the dissertation. If you have more code then you could include only representative examples of your code in an appendix – it is not necessary to submit all of your code. And if you have large amounts of code then you may also want to consider, for example, providing a link to a github location for your code – in this case you may still want to consider if it is appropriate to include some code in an appendix to the dissertation.

The markers of your dissertation may look over code, but do not in general need to follow it in detail. Instead you should describe your work in appropriate detail in the body of your dissertation (i.e. not in an appendix) so that the readers/markers of your dissertation can understand what you have done. If there are important aspects to your code then you can also highlight these at the appropriate place(s) in the body of your dissertation.

The dissertation should include:

1. The title page
2. 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 Statistical Science". No logo is required.
3. An abstract
4. Acknowledgements
5. Contents page
6. A bibliography

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	Weightings	Poor Fail (<35)	Fail (35-39)	Borderline (40-49)	Pass (50-59)	Good Pass (60-69)	Distinction (70-79)	Strong Distinction (80+)
STRUCTURE Understanding of aims Quality of general approach	10%	Hardly any understanding shown Serious lack of organisation.	Major failings in understanding, but some things right. Poor organisation.	Sensible but inadequate, perhaps with substantial errors.	A fairly good grasp of issues. Perhaps some errors.	A good grasp of issues. An efficient business-like approach.	A very good grasp of issues. High quality.	An excellent grasp of issues. Exceptionally good quality.
LITERATURE AND THEORY Quality of scrutiny of literature Understanding of relevant theory	10%	Seriously inadequate use of literature. Significant gross misunderstanding.	Shallow use of literature. Major failings in understanding, but some things right.	Adequate but very unambitious pursuit of literature. Some substantial failings in understanding.	Modest initiative shown. A fairly good grasp of issues.	A good study of the literature. A good grasp of issues.	A very good study of the literature. A very strong grasp of the issues.	Excellent, ambitious, inspired, meticulous.
EXPOSITION Quality of exposition of source materials Quality of elaborations of source materials Quality of mathematical argument	20%	Seriously incoherent. No attempt to fill gaps.	Very poor exposition. Elaborations very sketchy or insufficient. Substantial defects in mathematical arguments.	Uninspired and unambitious but with some sensible attempts.	Generally fairly clear and coherent exposition. Some initiative shown. Mathematical arguments mostly sound.	A mostly clear exposition, with clear indications of thought and initiative.	A strong and clear exposition, with thought and initiative.	Excellent, with clear indications of outstandingly good thought and initiative.
METHODOLOGY Appropriateness of choice of techniques Quality of data-collection and/or handling Quality of computer work Accuracy	30%	Gross carelessness. Seriously incorrect techniques. Very serious misunderstanding of computer output.	Careless. Poor and/or ill-considered approaches. Significant misunderstanding of computer output. Serious inaccuracy.	Unambitious and lacking in thought. Perhaps several errors.	Generally sound. Perhaps occasional errors.	Sound and well organised. Appropriate and accurate.	High quality.	Exceptionally assiduous, and of a very high quality throughout.
CONCLUSIONS Appropriateness of conclusions drawn Understanding of implications and limitations	20%	False conclusions. Lack of comprehension of relevant issues.	Poor attempts at drawing conclusions. Poor understanding of relevant issues.	Mainly logical and sensible but uninspired and with clear weaknesses.	Generally sound, with modest evidence of thought.	Thoroughly appropriate. Providing evidence of good understanding.	Very good insights.	Exceptionally good insights.
PRESENTATION Clarity of style Quality of diagrams and tables Proper referencing to the literature	10%	Seriously unclear or muddled expression. Seriously defective graphics and/or tables. Seriously inadequate referencing.	Poor expression. Unclear logic. Very sketchy referencing.	Variable clarity. Satisfactory individual items but insufficient of them. Poor referencing.	Generally clear. Generally sound. Satisfactory referencing.	Clear. Sound. Good referencing.	Very clear, high quality.	Excellent in all regards, meticulous.

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. There is no lower word limit, normally dissertations are between 8,000 and 12,000 words. The R code used, appropriately pruned, should be included as an appendix to the dissertation. It will not contribute towards the word count.

A PDF version of the dissertation is to be submitted online **by noon on 14 September 2026** on Inspera**.** The examiners intend that the electronic copy of your dissertation will be screened by Turnitin for plagiarism.

Students should read the details from the Examination Schools submission information before submitting any work.

Students should pay particular attention to the University's policies on plagiarism.

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:

Lateness	**Cumulative mark penalty**
Up to 4 hours, i.e. up to Monday 4pm	1 mark
4-24 hours, i.e. up to Tuesday 12 noon	10 marks
24-48 hours, i.e. up to Wednesday 12 noon	20 marks
48-72 hours, i.e. up to Thursday 12 noon	30 marks
72 hours -14 days	35 marks
More than 14 days	Fail

The penalty above would be deducted from a dissertation mark out of 100. For example, if a student submits a dissertation 22 hours late, and that dissertation itself is worth 68 marks, then the 10-mark penalty above means that the final mark is 58. The final mark awarded after applications of the penalty cannot be below 0.

Failure to submit a dissertation, without an accepted reason, will result in the failure of that assessment. In this case, the mark for any resit of the assessment will be capped at 50 and you would be ineligible for a merit or distinction overall. Such a resit is available on one occasion only to candidates who initially fail the whole MSc course.

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

Students will receive feedback on their dissertation using the form on the following page.

MSc/PG Diploma in Statistical Science - Dissertation Feedback Form

Student name:

Academic year:

Dissertation title:

[Instructions: tick one box for each of 1-5. The middle box corresponds to satisfactory work, while boxes to the right indicate stronger work and boxes to the left indicate weaker work. See also Section 2 of the Course Handbook for further explanation and for the weightings of criteria 1-5 below.]

1. Structure

Serious lack of organisation	☐	☐	☐	☐	☐	A good grasp of issues

2. Literature and Theory

Inadequate use of literature	☐	☐	☐	☐	☐	Very good, meticulous

3 Exposition

Seriously incoherent, no attempt to fill gaps	☐	☐	☐	☐	☐	Very clear, showing outstandingly good thought and initiative

4. Methodology

Careless, poor approaches	☐	☐	☐	☐	☐	Assiduous and of a very high quality throughout

5. Conclusions

Lack of comprehension of relevant issues	☐	☐	☐	☐	☐	Exceptionally good insights

6. Presentation

Unclear, defective graphics, and/or tables, inadequate referencing	☐	☐	☐	☐	☐	Clear, excellent quality and meticulous in all regards

Final Mark:

3.6 Expectations of study and student workload

Students are responsible for their own academic progress.

The MSc course is full-time, students are expected to work 35-40 hours per week. The course lasts a year, so this is the expected amount of work each week during the whole year, so includes term-time weeks and also weeks during the vacation. You can take some time off (holiday) during the year, say about 6 weeks' worth. You can choose how to schedule your time out of term, but you should not be expecting to take time off during term-time (nor just before/after term when there are scheduled MSc activities in week 0, 9 or 10). After the exams (late June approx.) until early/mid-September you should be working on your project and dissertation.

During Michaelmas and Hilary Terms you are likely to have lectures to attend most days, possibly every day, and in most weeks, you will have a practical session and one or more problems classes to attend. There is a Case Studies session most weeks, and a variety of one-off sessions, for example: an introduction to LaTeX and a Report Writing session in Michaelmas Term, feedback sessions following assessed practicals in Michaelmas and Hilary Terms, a session introducing MSc projects in Hilary Term, etc. In a typical day you might attend a couple of lectures, a practical/problems class, and from time-to-time a one-off session – this is given as a guide only and timetables will vary between different students depending on the options taken. In addition to taking two optional courses in each of Michaelmas and Hilary Terms, you are welcome to attend as many other optional lectures as you wish, though this would increase your workload. You can discuss this point, and points about how to manage your workload, with your supervisor.

Most students find that the time periods around assessed practicals are busy. The first assessed practical will be available a week before the submission deadline and the second assessed practical (a group project) will be available two weeks before. The practical assignments should take a maximum of about 16-20 hours' work. There is certainly enough time in this period to schedule your work on the assessed practical, but you will probably want to plan carefully. Lectures, possibly some problems classes etc., will continue during these periods and you are expected to attend these in the usual way (one-off sessions will normally be scheduled to avoid assessed practical periods).

The time each week not covered by formal teaching sessions is for your own independent study on MSc course material. At times this will be studying the material covered in a lecture before the next lecture, attempting questions on a problem sheet ahead of a scheduled problems class, preparing for or working on an assessed practical assignment, and so on. In a normal week during Michaelmas and Hilary Terms, perhaps about a third of your time would be in spent in teaching sessions, the rest in independent study. In Trinity Term, there will be few scheduled activities to allow you to concentrate on exam revision. Most weeks out of term will not have any organised sessions, your working time in those weeks would be independent study, or working on your project over the summer period.

The University's policy on undertaking paid work whilst studying can be found at https://academic.admin.ox.ac.uk/policies/paid-word-guidelines-graduate-students. It is not recommended that you work while studying on the MSc.

Students on a visa must ensure that they comply with rules on working while studying. Restrictions for the MSc apply during term and in the weeks where submissions are expected, as well as during the summer when students are expected to work on the dissertation. See more information here https://www.ox.ac.uk/students/visa/during/work.

4. Assessment

4.1 Assessment structure

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

For MSc candidates, the overall assessment is based on:

1. Examinations (50%)
2. Assessed Practical Work (25%)
3. Dissertation (25%)
4. Completing the Statistical Programming practical to a passing standard

The examinations component (1) consists of a number of exams. Each MSc candidate must sit exams on all of the core courses:

- SB1 Applied and Computational Statistics (8%)
- SB2.1 Foundations of Statistical Inference (6%)
- SB2.2 Statistical Machine Learning (6%)

Each candidate must also sit exams on four of the following optional courses:

- SC1 Stochastic Models in Mathematical Genetics
- SC2 Probability and Statistics for Network Analysis
- SC4 Advanced Topics in Statistical Machine Learning
- SC5 Advanced Simulation Methods
- SC6 Graphical Models
- SC7 Bayes Methods
- SC10 Algorithmic Foundations of Learning
- SC11 Climate Statistics

All optional exams contribute 7.5% towards the final degree.

The assessed practical work (2) will be made up of two practical assignments each of which is worth 12.5%.

The PGDip assessment structure is the same as the MSc but without the dissertation.

For both the MSc and the Diploma, candidates can pass, pass with merit, pass with distinction, or fail.

4.2 Examination conventions

Examination conventions are the formal record of the specific assessment standards for the course to which they apply. They set out how your examined work will be marked and how the resulting marks will be used to arrive at a final result and classification of your award. They include information on: marking scales, marking and classification criteria, scaling of marks, progression, resits, use of viva voce examinations, penalties for late submission, and penalties for over-length work.

The full Examination Conventions are approved by the departmental Teaching Committee in Michaelmas Term 2025 and are posted on Canvas.

4.3 Course regulations and syllabus

The regulations for the course can be found in the University of Oxford Examination Regulations. The Examination Regulations should be consulted for regulations concerning conduct of examinations and general regulations for graduate students. The lecture synopses define the detailed content of the course for each year.

4.4 Feedback on learning and assessment

Students can obtain feedback on their learning in the following ways:

Formative assessment:

- Completing the summer review exercises before course starts and comparing their work with the solutions provided at the start of Michaelmas Term;
- Written feedback form on practical 0 in Michaelmas Term;
- Feedback from coursework supervisor during supervision meetings in Michaelmas and Hilary terms;
- Completing non-assessed practical assignments, and assessed practicals, and comparing their work with material provided by the lecturer;
- Completing problem sheets before problem classes and comparing their work with solutions from classes;
- Week 0 Hilary term test (‘Collection’) - comparing their marked answers with the specimen solutions;
- Completing relevant past exam questions and comparing their answers with the specimen solutions available in the department;
- Feedback from project supervisor during project supervision meetings;
- Feedback from project supervisor on draft dissertation (possibly during project supervision meetings).

Summative assessment:

- Written feedback forms on the assessed practicals done in Michaelmas term

- Exam results, and overall assessed practical mark, published following the June/early July examiners meeting
- Dissertation result published in October
- Feedback form on dissertation distributed following the October examiners meeting.

Students are strongly advised to work through past papers to familiarise themselves with the form of examinations. Past examination papers can be found via the library database SOLO. Solutions to some examination papers are available on Canvas.

Past examiners' reports on the examinations are also available via Canvas.

4.5 Entering for University examinations

The written examinations will be held in Trinity Term, either at the Examinations Schools in the High Street or Ewert House in Summertown. Your personal timetable will be available on Student Self-Service at least two weeks before your first exam. You will receive an e-mail when it has been added. You can also find the timetable here: www.ox.ac.uk/students/academic/exams/timetables. The examinations are provisionally set to start on 1 June 2026.

You will be required to enter for the examinations. There are two exam entry windows in week 6 of Michaelmas Term and week 2 of Hilary Term. Students receive an e-mail when entry opens and are directed to Student self-service to complete the entry. **Entry must be completed within the deadlines, otherwise a fee must be paid to enter.** Options may be changed after entry, however a fee also applies.

In Michaelmas Term, students will only enter for the assessments that have submission deadlines before the Hilary Term entry. This is the Assessed Practical Work and Statistical Programming.

The examiners may summon any candidate for an oral examination, but rarely do so.

4.6 Sitting your examinations

Practical information and support for sitting in-person exams is provided on the Oxford Student exams guidance webpage.

Information is available for students requiring alternative examination arrangements.

Advice is also available on preparation and wellbeing during exams.

Calculators and statistical tables

Calculators are not permitted for most exams and you should follow instructions in Notice to Candidates sent to you by the Chair of Examiners regarding calculators.

Information on the use of Statistical Tables will also be available in the Notice to Candidates.

4.7 Problems completing your assessment

There are a number of University processes in place to help you if you find that illness or other personal circumstances are affecting your assessments or if you experience technical difficulties with an online exam or submission. Full information is available on the Oxford student problems completing your assessment webpage.

4.8 Examiners and assessors

There are three or four internal examiners and one external examiner appointed each year to examine the MSc and Postgraduate Diploma in Statistical Science. The internal examiners are members of the Department of Statistics. One will act as the Chair of Examiners. The names of the examiners for 2025/2026 are listed on the Examination Conventions, published in Michaelmas Term. 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 notices to candidates outlining the examination arrangements. These will also be posted on the MSc Canvas site.

The results for Postgraduate Diploma students will be known after the Examiner's Meeting which takes place a few weeks after the examinations. 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 Postgraduate Diploma, or October for the MSc, students should log on to Student Self Service to obtain their final results.

Students are not permitted to contact the internal Examiners, external examiner or the Assessors directly on any matter related to the examinations. Queries on examination matters should be directed to College Advisors, Departmental Supervisors, MSc Administrator or the Academic Administrator as appropriate. If you are unhappy with an aspect of your assessment you may make a complaint or appeal (see section 7.2).

Resitting examinations

If the examiners decide that the standard of a candidate's work is not sufficient to qualify for the MSc but sufficient to qualify for the Postgraduate Diploma in Statistical Science, 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 Postgraduate Diploma. In the event of a candidate's work not being sufficient 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.

4.9 Gutiérrez Toscano Prize

The Gutiérrez Toscano Prize, 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. On the Department website is a list of prize winners.

4.10 Academic integrity and the avoidance of plagiarism

Academic integrity

The University has a code of practice concerning academic integrity in research. While the code's principles relate specifically to the conduct of research, all graduate students are advised to make themselves aware of the contents. The University also has a code of practical on Public Interest Disclosure.

Plagiarism

University Definition

Plagiarism is presenting work or ideas from another source as your own, with or without consent of the original author, by incorporating it into your work without full acknowledgement. All published and unpublished material, whether in manuscript, printed or electronic form, is covered under this definition, as is the use of material generated wholly or in part through use of artificial intelligence (save when use of AI for assessment has received prior authorisation e.g. as a reasonable adjustment for a student's disability). Plagiarism can also include re-using your own work without citation. Under the regulations for examinations, intentional or reckless plagiarism is a disciplinary offence.

The necessity to acknowledge others' work or ideas applies not only to text, but also to other media, such as computer code, illustrations, graphs etc. It applies equally to published text and data drawn from books and journals, and to unpublished text and data, whether from lectures, theses or other students' essays. You must also attribute text, data, or other resources downloaded from websites.

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 expulsions from the University.**

Why does plagiarism matter?

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. 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 (word for word) quotation without clear acknowledgement

Quotations must always be identified as such by the use of either quotation marks or indentation, and with full referencing of the sources cited. 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.

Cutting and pasting from the Internet without clear acknowledgement

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.

Paraphrasing

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 if you do not give due acknowledgement to the author whose work you are using.

A passing reference to the original author in your own text may not be enough; you must ensure that you do not create the misleading impression that the paraphrased wording or the sequence of ideas are entirely your own. It is better to write a brief summary of the author's overall argument in your own words, indicating that you are doing so, 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 derived from your lectures.

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. As well as listing your sources (i.e. in a bibliography), you must indicate, using a footnote or an in-text reference, where a quoted passage comes from. Additionally, you should not include anything in your references 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 (for example, Bradshaw, D., Title of Book, discussed in Wilson, E., Title of Book (London, 2004), p. 189).

Failure to acknowledge assistance

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, or to ordinary proofreading, but it is necessary to acknowledge other guidance which leads to substantive changes of content or approach.

Use of material written by professional agencies or other persons

You should neither make use of professional agencies in the production of your work not submit material which has been written for you even with the consent of the person who has written it. It is vital to your intellectual training and development that you should undertake the research process unaided. Under Statute XI on University Discipline, all members of the University are prohibited from providing material that could be submitted in an examination by students at this University or elsewhere.

Auto-plagiarism

You must not submit work for assessment that you have already submitted (partially or in full), either for your current course or for another qualification of this, or any other, university, unless this is specifically provided for in the special regulations for your course. Where earlier work by you is citable, i.e. it has already been published, you must reference it clearly. **Identical pieces of work submitted concurrently will also be considered to be auto-plagiarism.**

This information was taken from the University webpage on Plagiarism, where you can also find more information and a link to a course on plagiarism, which you are strongly advised to take.

If examiners believe that submitted material may be plagiarised, they will refer the matter to the Proctors' Office. The results for the assessment will be pended while an investigation is carried out. If the Proctors consider that a breach of the disciplinary regulations has occurred, they can determine the penalty themselves in suitable cases or refer the matter to the Student Disciplinary Panel.

Your attention is drawn to the Student Handbook:

- Section '7.7 Plagiarism' in '7. 'Examinations and course requirements'
- Section '10.4 Proctors' role in plagiarism' in '10. Disciplinary procedures and rights'.

5. Skills and Learning Development

5.1 Academic progress

Each term students must write a short report on their progress on Graduate Supervision Reporting (GSR). GSR can be accessed through Student Self-Service and also through Canvas. GSR is open for students reporting in weeks 7-9. From week 10 onwards each term, the supervisor is responsible for writing a report about the student on GSR. Reports can be viewed by the student, supervisor, MSc Course Director, Director of Graduate Studies and College Advisors.

Responsibility for an individual student's progress is usually taken by the supervisor, but the MSc Course Director and the Administrator will also monitor progress of all students on the course. The reports from students and supervisors of GSR are also read and commented on by the Director of Graduate Studies. Unsatisfactory progress will also usually lead to discussion with appropriate college officers.

Students are always welcome at any time to discuss their concerns with their departmental Supervisor, the MSc Course Director, the Director of Studies, the Director and Deputy Director of Graduate Studies, the Head of Department, the Academic Administrator or MSc Administrator as appropriate.

5.2 Learning and development skills

Students are encouraged to attend the Distinguished Speaker Seminars and Departmental seminars as appropriate and also to attend talks organised by some of the research groups that may be of particular interest. The upcoming events are advertised on the Department website in Events section and through a weekly events e-mail and the Department Bulletin.

In addition to the assessed course on Statistical Programming, there are lectures on report writing (for practical reports, and for dissertations), and LaTeX document preparation, specifically for MSc students.

A wide range of information and training materials are available to help students develop their academic skills – including time management, research and library skills, referencing, revision skills and academic writing – though the Oxford Students site on study skills and training.

All Masters students 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.

Other training resources are available from the following:

- Bodleian Libraries
- IT Services

University Language Centre

International students, whose first language is not English, are strongly advised to find out more about the Academic Writing and Advanced Communication Skills courses that the University Language Centre runs during term time. These courses have a registration fee for graduate students.

5.3 Induction

In week 0 of Michaelmas Term, the week before the full term begins, students are provided with an induction programme, which includes:

- an introduction to the course from the MSc Course Director and Director of Studies;
- familiarisation with the Statistics Library and the Radcliffe Science Library resources;
- familiarisation with the computing facilities in the Department and the wider University computing facilities;
- an introduction to the Careers Service;
- general information about the Department of Statistics.

5.4 The Careers Service

The University Careers Service can be found at 56 Banbury Road. There is a wealth of information on the Careers Service website. It is a free service for all University of Oxford students and also 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.

6. Student Representation, Evaluation and Feedback

6.1 Departmental representation

The MSc and PGDip 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 Group, which meets once a term in week 3.

One of the representatives will be invited to attend the Departmental Teaching Committee and one the Facilities and Safety Committee.

6.2 Division and University representation

Student representatives sitting on the Divisional Board are selected through a process organised by the Oxford University Student Union (Oxford SU). Details can be found on the Oxford SU website along with information about student representation at the University level.

There is also a divisional level Graduate Joint Consultative Forum (GJCF). There is a student representative from each department on this committee, as well as the MPLS student representative and Oxford SU representatives.

6.3 Opportunities to provide evaluation and feedback

Feedback can be channelled through the informal meetings between supervisors and students, and the regular informal contact that students have with the MSc Course Director and with the MSc Administrator.

At the end of each term students are invited to complete feedback questionnaires 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 Teaching Committee, which will provide a summary and its response via Canvas, and are important part of our quality assurance procedures as part of the continuing review and development of the course.

Students on full-time and part-time matriculated courses are surveyed on all aspects of their course (learning, living, pastoral support, college) through surveys throughout the year. This includes the Postgraduate Taught Experience Survey and the Student Barometer. Information on these surveys and previous results can be found on the Student Surveys webpage. Results from the Student Barometer survey are discussed by the Departmental Teaching Committee.

7. Student Life and Support

7.1 Who to contact for help

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

In case of illness or being otherwise unable to attend practical classes or lectures, students should contact the MSc Administrator. Where illness or other factors will prevent submission of assessed practical work on time, students must contact the MSc Administrator and ensure that they submit for an extension.

Every college has their own system of support for students. Please refer to your College handbook or website for more information on who to contact and what support is available through your college.

Sources of support available from the wider University

All information is available on the Student Welfare webpages. This includes information on Disability Support, and the Student Counselling Service, as well as a range of other areas.

Other areas of support include Oxford University Student Union advice, and Nightline (Telephone 01865 270270).

Suspension of status or withdrawal from the 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 MSc Course Director or your Departmental Supervisor and also your College Office or College Tutor. You will also be required to fill in the relevant forms for a change of status on Student Self-Service.

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.

Students can get their transcripts through the eDocuments service and this includes the ability to share your transcript with third-parties. You will receive an e-mail with information about booking a degree ceremony.

For more information visit the student Graduation and leaving Oxford webpages.

Harassment

The Departmental advisors on matters of harassment are:

- Ms Hannah Harrison (room G.09, e-mail hannah.harrison@stats.ox.ac.uk);

- Dr Maria Christodoulou (room 3.10, e-mail maria.christodoulou@stats.ox.ac.uk).

For more information on harassment and bullying, see the University Harassment Policy .

Disability

The Disability Coordinator is Jonathan Whyman (room G.09, tel. 01865 272870, e-mail whyman@stats.ox.ac.uk).

The academic Departmental Disability Lead is Dr Neil Laws (room 1.04, tel. 01685 272597, e-mail laws@stats.ox.ac.uk).

The University support for students is the Disability Advisory Service .

Childcare services

The University support for student parents is outlined on Further Student Support. This includes if you have a child or are about to become a parent. The University also provides Childcare services.

Financial matters

For information on funding, visit University Fees and Funding webpages. For information on financial assistance, visit the Financial Assistance webpage.

7.2 Complaints and academic appeals in the Department of Statistics

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 course of study will result in no need for complaints (about that provision) or appeals (against the outcomes of any form of assessment).

Where such a need arises, 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) is often the simplest way to achieve a satisfactory resolution.

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

General areas of concern about provision affecting students as a whole should be raised through Joint Consultative Committees or vias student representation on the department's committees.

Complaints

If your concern or complaint relates to teaching or other provision made by the department, then you should raise it with the Director of Studies (Dr Neil Laws) or Director of Graduate Studies (Professor Julien Berestycki) as appropriate.

Complaints about departmental facilities should be made to the Departmental administrator (Ms Hannah Harrison). If you feel unable to approach one of those individuals, you may contact the Head of Department (Professor Frank Windmeijer). The officer concerned will attempt to resolve your concern/complaint informally.

If you are dissatisfied with the outcome, you may take your concern further by making a formal complaint to the Proctors under the University Student Complaints Procedure.

If your concern or complaint relates to teaching or other provision made by your college, you should raise it either with your tutor or with one of the college officers, 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

An academic appeal is an appeal against the decision of an academic body (e.g. boards of examiners, transfer and confirmation decisions etc.), on grounds such as procedural error or evidence of bias. There is no right of appeal against academic judgement.

If you have any concerns about your assessment process or outcome it is advisable to discuss these first informally with your subject or college tutor, Senior Tutor, course director, director of studies, supervisor or college or departmental administrator as appropriate. They will be able to explain the assessment process that was undertaken and may be able to address your concerns. Queries must not be raised directly with the examiners.

If you still have concerns you can make a formal appeal to the Proctors who will consider appeals under the University Academic Appeals Procedure.

7.3 Policies and regulations

The University has a wide range of policies and regulations that apply to students. These are easily accessible through the A-Z of University regulations and policies on the Oxford Students website.

Your attention is drawn to the Educational Recordings Policy.

These policies also include:

The University Equality Policy.

The Regulation relating to the use of IT facilities.

8 Facilities

8.1 Social spaces and facilities

The kitchen area in the Ground Floor Social Area of the St Giles' building is available for use with free tea, coffee and milk. A fridge is available to store lunch but all food must be removed at the end of the day and any food stored there must be adequately wrapped. Any food left unwrapped in the fridges may be disposed of. If the communal crockery and cutlery is used, this must be placed neatly in the dishwasher for cleaning. Do not leave dirty kitchenware on the side.

The Social Area is available as a seating area for lunch when space is available. Please note that the area may sometimes be booked for events. Please use this area to eat lunch and do not eat in the rooms on the lower ground floor.

Students are welcome to participate in the social and sporting activities of the Department and their college. Individual college websites give further details about all aspects of college provision.

Graduate students may become members of the University Club in Mansfield Road, and participate in the range of sporting activities provided by the University.

A complete list of clubs and societies at the University can be found here: https://www.ox.ac.uk/students/life/clubs.

8.2 Libraries

Statistics Library

The Department has its own small library in the lower ground floor of the St Giles' building. Copies of each of the core books on the reading list for the MSc in Statistical Science can be found there, as well as other resources. There are also a small number of desks for quiet study space.

A current University card is required for registering and for entry to the library. The library door should be kept locked at all times, so please ensure the door is closed after entering and exiting. Only the Librarian or administrative staff may give access to non-members of the Department.

Finding books

There is a computer in the library for searching on the University Catalogue via Search Oxford Libraries Online (SOLO), if required. Most books are catalogued via the Library of Congress system and shelves are marked with topics. If you are struggling to locate a book, please e-mail lib@stats.ox.ac.uk.

Borrowing books

MSc students can borrow up to 9 books at a time, with a load period of 4 weeks. To borrow a book, you must use the self-issue machine, located on top of the book return box. The Department is small and so is the library budget, missing books have

to be replaced, reducing the budget for new books. Any items without a barcode in the front of the book cannot be borrowed.

Renewing books

Books can be renewed a maximum of 4 times, after which they must be returned. You can renew a book via SOLO or by e-mailing lib@stats.ox.ac.uk. Please note that if a book is overdue or requested by another patron then renewal by patrons is not possible.

Returning books

Returned books should be left in the book returns box in the library. There is no need to scan the book. If another patron has requested a book, please return in a timely manner. If books are overdue, then reminder notices will be sent out by e-mail.

Reserving books

Reservation requests can be made via SOLO. Reserved books can be collected from office G.09 in the Department.

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

Please see the Statistics Library Information document for more detailed information and the rules of conduct.

Other University Libraries

The University Card also serves as a library card and will allow access to the Radcliffe Science Library (RSL) in Parks Road, the Social Sciences Library, Manor Road and a number of other Bodleian libraries. To find these locations, you can use the University Searchable Map. Please check the relevant library websites for their current borrowing and access policies.

The Physical Sciences Librarian with responsibility for the statistics collection in the RSL is Rachel Scanlon (e-mail: rachel.scanlon@bodleian.ox.ac.uk).

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

8.3 IT

The principle computing resource for the MSc in the IT Teaching Suite, LG.02. Students can use the desktops to run software packages such as R, Python or MATLAB, as well as to prepare documents and reports. Network attached printers are available and these can also copy and scan documents to your e-mail address or USB storage.

Statistical Programming and the practical sessions will introduce students to the use of the departmental computing systems and the main statistics packages. Other courses, particularly those on high-level programming languages, are provided by the University's IT Services and may be of interest to students. Project work in the summer will require the use of a computer and the desktops in the IT Suite are available for this. Please refer to the section on the dissertation for more information.

Individual photocopying/printing accounts are set up by IT staff and full details will be provided in the induction in week 0.

You should make yourself aware of the following departmental documents:

- Guidelines for Examining Users' Data
- Security and Privacy of Files
- Policy Statement on Computer Use, Monitoring and Surveillance

These documents are available on the main MSc in Statistical Science Canvas page.

8.4 Department of Statistics – general information

Access to 24-29 St Giles'

The Department building is open for MSc/PG Dip in Statistical Science 24 hours a day 7 days a week and is accessible by using your University card. Please note that any misuse of the building may result in access rights being restricted.

Care of the building

There is no caretaker for the building. Please report any building problems to building@stats.ox.ac.uk. We ask all of the building users to look after the building and to help with security, particularly out of hours. Please keep doors secure and follow the security notices.

Recycling is encouraged in the Department. A variety of recycling and disposal bins are provided, so please ensure items are placed in the correct bins. All items should be washed out before being placed in a recycling bins.

- Green topped bins – paper, cardboard, drinks cans, food tins, plastic bottles and other hard plastics can be recycled here.
- Turquoise topped bin (in Social Area kitchen only) – glass can be recycled here.
- There are two boxes in the Social Area kitchen for soft plastics and disposable cups. Please ensure these items are placed in the appropriate box rather than the recycling or general waste.
- Brown bin – any food waste can be placed in here. Please do not put in items such as compostable cups.

Please avoid using the lift out of general office hours, if possible.

Post

Pigeonholes

There are pigeonholes on the ground floor marked for department members and graduate students. MSc students have two shared pigeon holes. If you are expecting post, please collect it promptly, however, we encourage you to send post to your home address rather than to the Department.

University Messenger Service

The service collects and delivers mail for the departments and colleges of the University. Items can be left for collection in the tray in reception. Please note that this service is only to be used for university business and not for personal post.

Lost property

Items which have been found in the Department are held a reception. Uncollected items are disposed of at the end of each term.

Emergencies, security and safety

Fire

Please read the blue fire-action notices posted in the building 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 (999/112). 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. The assembly point is on the corner of the Physics building in Keble Road. 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, Deputy Administrator, or in their absence a fire marshall.

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. Personal belongings should not be left unattended at any time.

In an emergency, the University Security Service can be reached by phone on (01865 2) 89999.

First Aid

Lists of qualified First Aiders are posted on each floor and there is a First Aid Kit at reception. Out of hours, please phone (01865 2) 89999 for first aid assistance. For an ambulance phone 999/112 (add 9 at the start if calling from an internal phone).

Fires, security alerts and serious accidents must be reported to the Head of Administration or Deputy Head and the scene of report must remain undisturbed.

Department of Statistics
University of Oxford
24-29 St Giles'
Oxford
OX1 3LB

Tel: (01865 2) 72860 (Reception)

Departmental website: https://www.stats.ox.ac.uk/

8.5 Emergency Numbers

UNIVERSITY SECURITY SERVICES: (01865 2) 89999.

FIRE BRIGADE, AMBULANCE SERVICE, POLICE: (9) 999 or 112.