

DEPARTMENT OF STATISTICAL SCIENCE



# **MSc Data Analytics for Government Student Handbook**

# DEPARTMENT OF STATISTICAL SCIENCE

## MSc DATA ANALYTICS FOR GOVERNMENT

### STUDENT HANDBOOK

The *Department of Statistical Science MSc Data Analytics for Government Handbook* has been written for postgraduate students admitted by the Department of Statistical Science to study for the following degree:

#### **MSc Data Analytics for Government**

The *Department of Statistical Science MSc Data Analytics for Government Handbook* is intended to provide particular information for students registered for the degree listed above. General information about studying at UCL is given in the *Academic Manual* (<http://www.ucl.ac.uk/srs/academic-manual/overview>) and *Current Students* (<http://www.ucl.ac.uk/current-students/>) sections of the UCL website. It is important that you are aware of the contents of these sections of the UCL website.

The *Department of Statistical Science MSc Data Analytics for Government Handbook* contains numerous hyperlinks to sources of further information. The corresponding URL for each hyperlink is not always written out in full, so if you are reading a printed copy of the handbook, you may need to refer to the electronic version available at: [http://www.ucl.ac.uk/big-data/Training\\_Education/pghb\\_Data\\_Analytics\\_for\\_Government.pdf](http://www.ucl.ac.uk/big-data/Training_Education/pghb_Data_Analytics_for_Government.pdf) in order to access all of the information that you require.

*The information given in this handbook is as far as possible accurate at the date of publication, but the Department reserves the right to make amendments before the commencement of, or during, the courses to which it refers. Information concerning College regulations and procedures is given for guidance only and is not intended as a substitute for that contained in the UCL Academic Regulations and on the main UCL website (available from the web addresses above).*

Department of Statistical Science, University College London, September 2019.

# CONTENTS

The *Department of Statistical Science MSc Data Analytics for Government Handbook* includes information on the following:

CONTENTS .....	2
PROVOST’S WELCOME .....	5
DEPARTMENT OF STATISTICAL SCIENCE.....	6
Staff.....	6
Academic staff.....	6
Teaching staff.....	6
Support staff.....	6
Staff with particular responsibility for taught postgraduates.....	6
The Programme Director.....	6
Operations Administrator.....	6
Personal Tutor.....	7
Other relevant staff roles .....	7
Students’ common room and departmental student society .....	7
Study facilities.....	7
How UCL and the Department will communicate with students.....	8
Email.....	8
Processing of personal information.....	8
How UCL uses student data.....	8
Portico.....	9
Return of coursework .....	9
References.....	9
CALENDAR OF EVENTS.....	9
UCL term dates .....	9
Final verification for student term 2 module choices .....	10
UCL examination periods.....	10
Key dates .....	10
Term 1.....	10
Term 2.....	11
Term 3.....	11
Start of June to start of September.....	11
TEACHING AND STUDYING ARRANGEMENTS .....	11
Course System .....	11
Timetable.....	12
Scheduled teaching and learning activities .....	12
Lectures .....	12
Tutorials .....	12
Workshops .....	12
Problem classes.....	12
Office hours.....	12
Learning resources and key facilities .....	13
UCL Library Services .....	13
UCL Information Services Division (ISD).....	13
UCL Centre for Languages & International Education (CLIE).....	14
Moodle .....	14
Calculators.....	14
Statistical tables.....	14
Feedback on student work.....	15
Model answers .....	16
WHAT IS EXPECTED OF STUDENTS .....	16

Student code of conduct .....	16
Attendance requirements .....	17
Tier 4 students: absence from teaching and learning activities .....	17
Absence from assessment .....	18
Studying .....	18
Tutorials .....	18
Lectures, workshops and problem classes .....	18
Coursework .....	18
Self study .....	19
Total workload .....	19
DEGREE PROGRAMME SPECIFICATIONS .....	19
Course codes .....	19
Selecting courses .....	20
MSc Data Analytics for Government .....	20
Aims and objectives .....	20
Curriculum .....	21
Flexible study .....	22
MSC PROJECT .....	22
Guidelines for preparation and submission .....	22
Guidelines for assessment .....	23
EXTENUATING CIRCUMSTANCES AND REASONABLE ADJUSTMENTS .....	24
Illness and other Extenuating Circumstances .....	24
Reasonable adjustments .....	24
Special examination arrangements .....	25
Extenuating circumstances .....	25
Support to study policy and fitness to study procedure .....	26
EXAMINATIONS .....	27
Complete and non-complete courses .....	27
Components of compulsory assessment .....	27
In-course assessment .....	27
Written examinations .....	28
Final course mark .....	28
UCL Feedback Turnaround Policy .....	28
Plagiarism and collusion .....	29
What isn't acceptable? .....	29
What is acceptable? .....	30
Some examples .....	30
How to avoid plagiarism and collusion .....	31
Examination irregularities .....	31
Examination marks .....	32
Marking, second-marking and moderation .....	32
External examining at UCL .....	32
Boards of examiners .....	32
Appeals concerning examination results .....	32
Reassessment .....	33
SCHEME FOR THE AWARD OF AN MSC .....	34
CHANGES TO REGISTRATION STATUS .....	34
Changing programme .....	34
Tier 4 students and changing programmes .....	35
Interruption of studies .....	35
Withdrawing from a programme .....	35
STUDENT SUPPORT AND WELLBEING .....	35
Central wellbeing and support services .....	35
The Student Centre .....	35

Student Disability Services .....	35
Student Psychological Services .....	36
International student support and welfare .....	36
Accommodation .....	36
Financial support .....	36
Student of Concern .....	36
Registering with a doctor and out-of-hours support services .....	37
Registering with a doctor .....	37
Out-of-hours support and information helpline .....	37
Crisis support - immediate help .....	37
Equality and diversity .....	37
Departmental Equal Opportunity Liaison Officers .....	38
UCL's zero tolerance policy on harassment and bullying .....	38
Harassment and bullying .....	38
Sexual misconduct .....	38
Support for students who have been affected by sexual violation .....	38
STUDENT REPRESENTATION .....	39
Students' Union UCL .....	39
Student societies .....	39
Academic Representatives .....	39
Staff-Student Consultative Committee .....	40
Departmental Teaching Committee .....	40
The Advice Service .....	40
Student complaints .....	40
Informal resolution .....	40
Formal complaints .....	41
STUDENT FEEDBACK .....	41
Student surveys .....	41
Student evaluation questionnaires (SEQ) .....	41
The Annual Student Experience Review (ASER) .....	42
UCL ChangeMakers .....	42
EMPLOYABILITY AND CAREERS .....	42
Careers information .....	42
UCL Careers .....	43
Entrepreneurship at UCL .....	43
UCL Global Citizenship Programme .....	43
HEALTH, SAFETY AND SECURITY .....	44
Health, safety and security at UCL .....	44
AFTER STUDY .....	44
Transcripts .....	44
UCL Alumni Online Community .....	44
COURSE INFORMATION .....	44

# PROVOST'S WELCOME

Dear students

To those of you who are returning, welcome back. To those of you who are new, congratulations for choosing UCL as your university.

Whatever your degree programme, your UCL education offers fantastic opportunities to stretch your intellect, expand your experience and develop your skills. And you are in London, which was this year recognised by QS as the best city in the world for students.

We want you to learn how to think, not what to think: through our Connected Curriculum you have the opportunity to take part in research and enquiry and to create new knowledge. Your programmes are informed by the work of UCL's world-leading researchers and are designed to develop your skills of analysis and problem-solving, preparing you for your career, wherever it takes you. At UCL, we believe the best way to solve a problem is to bring together thinking from different academic disciplines. This is reflected in the UCL Grand Challenges, our joined-up approach to the world's most pressing problems. Most of our degrees allow you to take elective modules from other disciplines within UCL and we encourage language study, to bring new perspectives to your studies.

I warmly encourage you to shape your journey at UCL. Take our university-wide surveys and make your voice heard. Become a ChangeMaker or an Academic Representative and work in partnership with academics to make your programme of study even better.

You'll also have opportunities to learn outside your degree programme. Participate in our Global Citizenship Programme, exploring ways of addressing some of the world's most pressing challenges in the two weeks of summer term following exams. Get involved with amazing volunteering opportunities (coordinated by the Volunteering Services Unit) and make a difference locally. Investigate opportunities for entrepreneurship through UCL Innovation and Enterprise.

UCL is first and foremost a community of great minds. You are a valuable member of that community. I hope you will take every opportunity to shape your time here, so that your experience is the best possible.

Professor Michael Arthur  
UCL President and Provost

# DEPARTMENT OF STATISTICAL SCIENCE

The Department of Statistical Science is a constituent department of the Faculty of Mathematical and Physical Sciences (abbreviated to MAPS). Some information about the history of the Department is provided on the [Departmental website](#).

The Department of Statistical Science is located on the first and second floors of 1-19 Torrington Place. The offices of the academic staff are all in this location. The Departmental Office can be found in room 120 on the first floor.

## Staff

### *Academic staff*

Prof RE Chandler (Head of Department)

Dr G Ambler	Dr G Baio	Dr JA Barber
Dr A Beskos	Dr C Cotar	Prof M De Iorio
Prof P Dellaportas	Prof T Fearn	Prof JE Griffin
Dr CM Hennig	Prof VS Isham	Dr SJ Livingstone
Prof SE Guillas	Dr FJ Király	Dr PJ Northrop
Dr I Manolopoulou	Dr G Marra	Prof RZ Omar
Dr AG O’Keeffe	Prof SC Olhede	Prof AS Siddiqui
Dr Y Pokern	Dr K Sadeghi	Dr ADL van den Hout
Dr K Stavrianaki	Dr RBA Silva	Dr J Xue
Dr T Wang	Dr HM Wilkinson-Herbots	

### *Teaching staff*

Dr N Abourashchi	Dr A Donovan	Dr SJ Harden
Dr J Herbert*	Dr TR Honnor	Dr EM Jones
Dr MJ Rassias	Dr C Selcuk	

\*members of staff indicated with an asterisk are based outside UCL

### *Support staff*

Mrs D Jayawardena Wilkinson (Departmental Manager)

Dr RG Evans	Mr Joe Hird	tbc
Ms KA Leport	Mr J Picken	Mr C Visavakul

## Staff with particular responsibility for taught postgraduates

### *The Programme Director*

Dr Kayvan Sadeghi is Programme Director for MSc Data Analytics for Government, and responsible for the day-to-day running of the programme.

Dr Kayvan Sadeghi (room 144, [k.sadeghi@ucl.ac.uk](mailto:k.sadeghi@ucl.ac.uk) )

### *Operations Administrator*

The Operations Administrator works closely with Keyvan and is the first point of contact for many aspects of your studies. For example, you should contact the Operations Administrator

to notify absence from college, to submit medical documentation or to change a module registration.

The Operations Administrator is Agnes Somogyi (room 123, [a.somogyi@ucl.ac.uk](mailto:a.somogyi@ucl.ac.uk)).

### **Personal Tutor**

UCL is committed to providing all students with the academic guidance and personal support that they need to flourish as members of our active learning and research community. As part of the wider support infrastructure provided by a programme, every student will be assigned a member of staff who can provide constructive academic and personal development guidance and support. At the start of the year, students will be provided with the name and identity of their Personal Tutor, the date of their first meeting, and where and when the Personal Tutor can be found in term time. Students are encouraged to be proactive in engaging with their Personal Tutor, as it is the responsibility of the student to keep in touch.

Your Personal Tutor's name is shown on your Portico record (see "Portico" section on page 9) and it is expected that it will be the same person throughout the whole of your degree programme.

Further information:

- [Personal Tutors](#)

*If you become unhappy with your degree programme, or a particular course, or with your progress, or if you cannot cope, or if you have other problems, you should immediately discuss the matter with the Programme Director, Operations Administrator or your Personal Tutor. Such problems are often much simpler to deal with if they are addressed immediately. You will then be directed to an appropriate person for more specialist advice if that is necessary.*

### **Other relevant staff roles**

**Chair of Staff-Student Committee:** Dr Y Pokern (room 135)

**Chair of Departmental Teaching Committee:** Dr S Harden (room 140)

### **Students' common room and departmental student society**

Room 117 is the common room for all taught students registered in the Department of Statistical Science. All such students are eligible for membership of the student-run Statistics Society, which organises social and other activities. Any mail arriving in the Department addressed to taught students will be placed in the pigeonholes in the Students' Common Room.

### **Study facilities**

Masters students have their own study room (the Postgraduate Study Room, room 116), which contains several PCs. This facility is managed by the Departmental Systems Administrator, **Mr C Visavakul** (room 132, [c.visavakul@ucl.ac.uk](mailto:c.visavakul@ucl.ac.uk)). Students may also use the lecture room 102 for study when it is not being used for lectures or other classes and meetings.

Departmental opening hours are 08:00 to 19:00 on weekdays (Mondays to Fridays). Outside these hours postgraduate students still have access to the building via their entry/ID cards during 1-19 Torrington Place opening hours, which are 06:30 to 23:00 on weekdays and 08:00 to 20:00 at weekends. Access to the Department outside normal office hours will require knowledge of the key-pad entry codes, which can be obtained from the Departmental Office.



Please note that out-of-hours access is restricted to departmental rooms only and that the rest of the building (including the ISD computer cluster, room 113) will still close at 19:00.

There is substantial space for reading and studying in the College Library (see page 13).

## How UCL and the Department will communicate with students

UCL will communicate with students via:

- [UCL student email](#) – Students should check their UCL email regularly.
- [UCL Moodle](#) – UCL's online learning space, used by module organisers, programme leaders, departments and faculties to provide essential information in addition to learning resources.
- myUCL – A weekly term-time e-newsletter to all students (undergraduate and postgraduate) at UCL, which covers key internal announcements, events and opportunities.
- [UCL Instagram](#) – UCL's official Instagram channel, featuring news, events, competitions and images from across the UCL community.
- [@ucl Twitter channel](#) – Sharing highlights of life at UCL from across UCL's diverse community.

### **Email**

Email is used for communication throughout the College and you will be allocated an email address by UCL (see <http://www.ucl.ac.uk/isd/services/email-calendar>). Please check your UCL email account regularly. There may be urgent messages left for you, e.g. from Student and Registry Services, the Departmental Office, your Personal Tutor, or from staff teaching courses that you attend.

Your tutors, lecturers and College administrative staff will use your *College email address* and expect you to read and act promptly upon all messages sent to you at this address. If you wish to use only your own email address from a provider external to the College, then it is your responsibility to arrange for emails to be forwarded from your College email address. However, UCL cannot be held responsible for mail that is delayed or lost as a result of being forwarded to an external provider. *Any consequences arising from not acting upon emails to your College address rest with YOU.*

## Processing of personal information

Whilst you are a student at UCL, the College will need to store and communicate information about you. This section summarises UCL and Departmental procedures with respect to such information.

### **How UCL uses student data**

UCL uses student information for a range of purposes connected with their studies, health and safety. UCL takes the protection of student information very seriously and complies with the Data Protection Act (DPA) 1988. Information about students will only be shared within UCL when necessary. UCL may also be required by law to share information with some external agencies for a variety of purposes, such as the Students' Union, the Higher Education Statistics Agency and UK Visas and Immigration. After students leave UCL their data is retained in the permanent archives.

Further information:

- [UCL General Student Privacy Notice](#)
- [UCL Confidential Information Statement](#)

- [UCL Information Security Policies](#)
- [data-protection@ucl.ac.uk](mailto:data-protection@ucl.ac.uk)

### **Portico**

Portico is the main UCL student information system which is used by all students for:

- Updating personal data such as addresses or contact numbers
- Completing online module registration
- Viewing information about programmes/modules
- Viewing examination timetables and results
- Pre-enrolment and re-enrolment
- Applying for graduation ceremonies

Further information:

- [Portico login](#)
- [Portico Helpdesk](#)

If you need a document that can be used to confirm your registration status at UCL, you can print out a Statement of Student Status letter or an opening a bank account letter via Portico. Just log into Portico and click on the Statement of Student Status link on your Portico home page. Alternatively you can send an email request to [studentstatus@ucl.ac.uk](mailto:studentstatus@ucl.ac.uk) with your name, student number, date of birth and desired delivery address. Please note that the Department will **NOT** issue certificates of student status or attendance.

It is your responsibility to ensure that your personal details held on the UCL central record are correct and up-to-date. This information can be viewed via Portico. Instructions on how to update your personal information can be found at: [https://www.ucl.ac.uk/current-students/services\\_2/personal\\_information](https://www.ucl.ac.uk/current-students/services_2/personal_information). *Any consequences arising from the failure to correct or update your personal information rest with **YOU**.*

### **Return of coursework**

Marked coursework, bearing a grade, may be returned to you via your pigeonhole, in classes, or through the Departmental Office. These routes are not completely secure and may result in other students seeing your grade. If you are unhappy about this, you should discuss your concerns with the course tutor.

### **References**

We need your explicit permission to give any reference for you. This applies to **ALL** references, (e.g. for a landlord, a prospective employer or a Masters degree programme). Thus, when you give either the Department's or a tutor's name as a referee, it is important that you complete and sign a "Reference Request" form confirming that you have done so. The form is available from the Departmental Office and the DOSSSH Moodle page ([see page](#)).

## **CALENDAR OF EVENTS**

### **UCL term dates**

Terms for the 2019/20 session:

First Term	Monday 23 September 2019 – Friday 13 December 2019
Second Term	Monday 13 January 2020 – Friday 27 March 2020
Third Term	Monday 27 April 2020 – Friday 12 June 2020

The week commencing 23 September is 'welcome week'. Timetabled teaching will begin in the week commencing 3 October 2019.

For those departments that operate them, Reading Weeks are the weeks beginning Monday 4 November 2019 (term 1), and Monday 17 February 2020 (term 2).

Christmas College Closure	Close 17:30 Friday 20 December 2019 Open 09:00 Wednesday 02 January 2020
Easter College Closure	Close 17:30 Wednesday 08 April 2020 Open 09.00 Wednesday 15 April 2020
Bank Holidays	Closed - Monday 08 May 2020 Closed - Monday 25 May 2020 Closed - Monday 31 August 2020

Further information:

- [Term dates 2019/20](#)

### ***Final verification for student term 2 module choices***

Initial module selections will need to be made by the following deadlines:

	<b>September Starters</b>	<b>January Starters</b>
Students select modules for the year ahead (any changes to Term 1 modules will also need to be made by this deadline)	11 October 2019	January (Term 2, Week 2)
Departments approve selections for the year ahead, Deadline for the approval of term 1 changes	25 October 2019	January (Term 2, Week 3)
Students request amendments to term two onwards modules and module selection verification	2 – 6 December 2019	Not applicable
Departments approve any changes to Term 2 or 3 modules.	13 December 2019	Not applicable

Exact deadlines will be published each year in the Student and Registry Services calendar and in the 'Module Selection Task' on Portico.

It is very important that module selections are verified by the above dates as the examination timetable will be based on the information recorded on Portico at this point.

### **UCL examination periods**

Main Exam Period	Monday 28 April 2020 – Friday 05 June 2020
Late Summer Exam Period	Monday 24 August 2020 – Friday 04 September 2020

### **Key dates**

#### ***Term 1***

- **W/C 23 September:** Students carry out *College enrolment* and *module registration*.

Further details concerning induction arrangements for new students are provided upon arrival at the Department.

*College enrolment* is organised by Student and Registry Services, who send you information about the procedure before the start of the term. New students must complete enrolment in person when they arrive at UCL. Continuing students can re-enrol online.

*Module registration* is done using the online Portico system (see “Portico” section on page 9). The procedure will be explained to you upon arrival (see also “Degree Programme Specifications” section on page 19). Tutorial groups are allocated automatically and your groups will appear in your online timetable (see “Timetable” section on page 12).

- **W/C 3 October:** Beginning of *lectures* for all courses in the Department of Statistical Science. Friday is the deadline for making term 1 *module amendments*.
- **W/C 4 November:** This is *Reading Week*. Classes in the Department of Statistical Science are replaced by self-study activities, including some set by the course lecturers. *Not all departments observe reading week and you MUST attend classes given in other departments if they continue during this time.*
- **W/C 2 December:** Friday is the deadline for making term 2 *module amendments*.
- **W/C 9 December:** End of all term 1 *teaching* in the Department of Statistical Science.

### **Term 2**

- **W/C 13 January:** Beginning of *lectures* in the Department of Statistical Science. Students should check their online timetable for the term 2 tutorial arrangements, and also check for any other timetable changes that may have occurred.
- **W/C 17 February:** This is *Reading Week*. Refer to the corresponding item in term 1 for details.
- **W/C 23 March:** End of all *teaching* in the Department of Statistical Science.

### **Term 3**

- **W/C 27 April:** Monday is the start of the *examination period*.
- **W/C 8 June:** Friday is the end of the *examination period*.

### **Start of June to start of September**

- Students work on their *project*, culminating in an oral presentation and submission of the final version of the dissertation at the start of September.
- For students who are required to *resit* elements of the taught component during the summer, these assessments will take place between 24 August – 11 September.

*Courses not organised by the Department of Statistical Science may not follow the above schedule. For further information you should check with the relevant teaching department.*

## **TEACHING AND STUDYING ARRANGEMENTS**

### **Course System**

Taught postgraduate programmes are made up of component courses. Most courses consist of lectures supplemented by at least one of the following: *tutorials, workshops, problem classes*. The proportions of these activities vary over courses; details for courses offered by the Department of Statistical Science are provided later in this handbook.

## Timetable

The timetable for lectures, workshops and problem classes can be found at <http://www.ucl.ac.uk/timetable>. After making your module selections on Portico, tutorial allocation will be arranged by the relevant Teaching Administrator before courses start and your tutorial group will automatically appear in your online timetable. However, it may take one or two days after registration has been approved before all of the classes appear on your personal timetable, particularly for tutorials. Check your timetable frequently, in case alterations have been made. *Note also that, once allocated, your tutorial group will **NOT** be changed unless you can demonstrate a timetable clash.*

Although the timetable states that lectures (and other classes) begin and end on the hour, there is a College-wide agreement that this refers to a starting time of *5 minutes past the stated hour* and a finishing time of *5 minutes to the hour*. This should give you time to get to your next lecture before it is due to start.

## Scheduled teaching and learning activities

### Lectures

These are formal and can involve large groups, often including students from other degree programmes. Where possible, Statistical Science lectures take place in lecture rooms 102 and 115 in 1-19 Torrington Place. These rooms are too small for many of the larger courses, however, and therefore many Statistical Science lectures take place in other rooms around the College, as do lectures for other UCL courses.

### Tutorials

Small group weekly tutorials are provided for some courses. These are less formal than lectures and enable you to raise your own questions about course material, as and when they arise from lectures or coursework.

### Workshops

Workshops, also referred to as "practical classes" within the Department, involve doing set work under guidance from the course staff. Some workshops will take place in computer cluster rooms. You should take a pocket calculator to all workshops (see page 14 for guidelines regarding calculators).

### Problem classes

These involve discussing coursework with the whole class.

### Office hours

For courses offered by the Department of Statistical Science, each member of the academic and teaching staff should nominate at least one weekly office hour during term time in which they will be available to answer general queries arising from lectures, problem sheets, etc. If you need to consult a course lecturer, please do so in an office hour. *In particular, in the period leading up to any assessment (see "In-Course Assessment" section on page 27) the course lecturer will set aside a fixed time or times at which (s)he will be available to answer questions about the assessment. (S)he will **NOT** answer queries about the course outside these times until the assessment is over.*

For other courses, refer to the corresponding information published by the relevant teaching department.

## Learning resources and key facilities

### ***UCL Library Services***

UCL has 19 libraries and a mixture of quiet study spaces, bookable study rooms and group work areas. Each library has staff that students can ask for help. The UCL Library Services page has information for students about using the library, services available, electronic resources and training and support.

- [Library information for students](#)

The Science Library (in the DMS Watson building, Malet Place) contains an exceptionally good collection of statistical science text and reference books. Copies of most books that are highly recommended for courses taught by the Department are included in the Short Loan Collection on the ground floor in the Science Library. The Collection consists of all subjects of the Science Library and is arranged on open access shelves in one alphabetical sequence under authors. The period of loan for statistical science books is 2 days. Books cannot be taken out of the room without being issued. Other recommended books, for which there is less demand, are kept on the third floor of the Science Library. The loan period assigned to these is one week. There are longer loan periods for other books.

UCL Library Services has developed a set of online training materials, to help users find and use information effectively. Topics covered include finding materials in reading lists; search tips and techniques; accessing electronic resources; referencing; and copyright and plagiarism issues. Students taking project courses may also benefit from the more advanced “WISE for Built Environment, Engineering, Maths and Physical Sciences” course, accessible from <https://www.ucl.ac.uk/library/training/guides>.

A new graduate Research Grid was opened recently on the fourth floor of the Science Library. This can accommodate up to 74 graduate students and offers a variety of workstations and study spaces to suit individual study as well as collaborative social learning. The new learning space features a group meeting room, a private Skype point, student lockers, 24 all-in-one Desktop PCs and a hot water point for tea and coffee.

### ***UCL Information Services Division (ISD)***

The UCL Information Services Division (ISD), the primary provider of IT services to UCL, offers IT learning opportunities for students and staff in the form of ‘How to’ guides which provide step-by-step guidance to all of ISD’s key services, including email and calendar services, user IDs and passwords, print, copy and scanning, wifi and networks. There are also opportunities for digital skills development through face-to-face training in areas such as data analysis, programming, desktop applications and more, along with individual support through drop-ins and via the ISD Service Desk. UCL also has a licence for Lynda.com which provides thousands of high quality video-based courses from programming to presentation skills. Learning on Screen (“bob”) provides students with access to an archive of 65 free-to-air channel programming for educational usage. In addition, Kanopy (“thoughtful entertainment”) is available to UCL students, and offers a wide range of movies.

14

E-learning services available to students include Moodle, Turnitin and Lecturecast and allow students to access online course materials or take part in online activities such as group work, discussions and assessment. Students can re-watch some lectures using the Lecturecast service and may also use interactive tools in the classroom.

ISD provides desktop computers and laptops for loan in a number of learning spaces. Information on Learning and Teaching spaces as well as a map of computer workrooms is available on the ISD website. Computers at UCL run a Desktop@UCL service which provides access to hundreds of software applications to support students. It is also possible to access a large range of applications remotely, from any computer, using the Desktop@UCL

Anywhere service. Students also have access to a range of free and discounted software via ISD Software for Students.

All students are encouraged to download the UCL-Go app, available for iOS and Android devices. The app gives access to Moodle and timetabling and shows where desktop computers are available on campus.

### ***UCL Centre for Languages & International Education (CLIE)***

The UCL Centre for Languages & International Education (CLIE) offers courses in over 17 foreign languages (including English), along with teacher training courses, across a range of academic levels to support UCL students and staff and London's wider academic and professional community. CLIE provides degree preparation courses for international students, courses satisfying UCL's Modern Foreign Language requirements and a range of UCL summer school courses. Students can also access a database of language-learning resources online through the CLIE Self-Access Centre, including film and documentary recommendations and books for self-study.

Further information:

- [CLIE website](#)
- [CLIE Self-Access Centre](#)

### ***Moodle***

Moodle is UCL's online learning space. It includes a wide range of tools which can be used to support learning and teaching. Moodle is used to supplement taught modules, in some cases just by providing essential information and materials, but it can also be integrated more fully, becoming an essential component of a module. Some modules may use Moodle to provide access to readings, videos, activities, collaboration tools and assessments.

All courses in the Department of Statistical Science have a presence on Moodle, and students registered for these courses can use the service to access online resources such as course information, lecture notes and assessment material. Students are given additional printing credits, to allow them to print copies of the lecture notes for each of their statistics courses.

Further information:

- [Moodle](#)
- [Frequently Asked Questions](#)
- [Quick Start Guide](#)

### **Calculators**

There are eight calculator models that the College has approved for use in examinations. These are the Casio FX83ES, FX83GT+, FX83MS and FX83WA which are all battery powered, and Casio FX85ES, FX85GT+, FX85MS and FX85WA which are all solar powered. *Students on the degree programmes covered by this handbook may **NOT** use any other type of calculator in Statistical Science examinations.* Students are therefore strongly advised to purchase one of these calculators at the start of their degree programme. The use of a non-approved calculator constitutes an examination irregularity (i.e. cheating) and carries potentially severe penalties.

### **Statistical tables**

Statistical tables are provided by the College for use in all examinations set by the Department. The currently provided tables are *New Cambridge Statistical Tables* by D.V.Lindley & W.F.Scott. These will be the statistical tables referenced in the Department's courses.



## Feedback on student work

Students receive feedback on all items of assessed coursework (see “Components of Compulsory Assessment” section on page 27) and on selected items of non-assessed work. Feedback may be given in tutorials, problems classes or electronically. It may take the form of verbal or written comments, either personalised or in the form of general points that emerged from the class as a whole. These comments are intended to help you see what was done well and where there is room for improvement. For assessed work, the comments are also provided to help justify the grade awarded.

For assessed work, feedback will include a *provisional* letter grade. The correspondence between letter grades and percentage marks, along with guidance regarding the interpretation of each grade, is as follows:

	Grade	Mark	Interpretation
	A+	≥ 80	The criteria for an A grade are all met. Additionally, exceptional quality has been demonstrated with respect to at least two of the following: understanding, insight, depth of analysis or clarity of discussion, with evidence (where appropriate) of relevant knowledge or reading.
	A	70 to 79	The criteria for a B grade are all met, along with one or more of the following: high quality answers in a wide range of questions, evidence of a very sound understanding, thoroughness of discussion and clarity of expression, evidence of insight, wide knowledge or reading. There may be a small number of relatively minor errors or inconsistencies, but there should not be serious errors in knowledge or understanding.
Pass	B	60 to 69	Good understanding of the questions asked, good knowledge of the main aspects of the subject and good levels of appropriate skills (such as the ability to carry out calculations and manipulations, and to develop a logical argument), along with a level of understanding appropriate to a Masters qualification. At the higher end of the range, one would expect to see clear expression and presentation. A few mistakes are allowable, providing they are not serious.
	C	50 to 59	Reasonable understanding of the subject (sufficient for a pass at Masters level) and a reasonable level of ability in the appropriate skills. At the lower end of this range, work may differ from scripts in the 46-49 range by showing a wider knowledge or having more convincing answers. At the higher end, work in this category may fail to reach Grade B either because it does not demonstrate a wide enough range of knowledge (e.g. some good answers, but too many questions or part questions either omitted or answered inappropriately), or because skill deficiencies lead to too many mistakes or badly presented answers.
Fail	D	40 to 49	Some limited understanding of the subject, but insufficient for a pass at Masters level. This grade might indicate, for example, a serious but largely unsuccessful attempt at a paper; or that some progress has been made but in an insufficient number of questions or at an insufficient level of analysis. It might also indicate answers that show some knowledge of the main concepts, definitions and terminology but are limited, for example, by errors or ambiguities in notation, or because their relevance to the question is not made clear.



	<b>Grade</b>	<b>Mark</b>	<b>Interpretation</b>
	F	≤ 39	At the lower end of this scale, the answers will show little or no understanding of either the questions or the subject. At the higher end, a very limited understanding may be present, but answers will present little evidence of relevant knowledge and contain many mistakes, irrelevancies or misunderstandings. In practice, one might expect a mark at the lower end to indicate that a candidate has not made a serious attempt at answering the questions or who has practically no understanding of the subject; and a mark at the higher end to arise when questions have been attempted but the answers contain little of relevance.

## Model answers

Many Statistical Science courses have regular sets of exercises. These are designed to help students learn and, in most courses, it is essential that students do the exercises in order to understand the subject. Course lecturers are often asked to provide model answers to the exercise sheets. There is a similar demand for model answers to past exam papers. Lecturers do provide model or outline answers to some exercises and to some exam questions, but it is Departmental policy not to do so in general, for a number of reasons:

- We do not want to encourage students to “learn answers” but rather to create a culture in which they know that they must work out the answer for themselves. Often it is not the answer, but the process of working it out that is the main learning experience.
- We are trying to encourage independent thought and understanding, so that students can answer (more or less well) different questions, similar questions in different forms, and to solve related problems. Understanding in statistical science, and in mathematics, comes much more from doing than from reading.
- It is important for students to learn how to persevere with a problem when they are “stuck”. In the past, we have found that model answers handed out in one year are often passed on to students in a subsequent year, to the detriment of the learning process.

A common argument put forward by students is “Yes, we want to do the exercises, but we would like model answers in order to check that we have the right method and answer”. Of course it can sometimes be helpful to look at answers, but it is also important to learn how to verify answers when they are not otherwise available, and to gain the confidence to know when you are right. One function of tutorials is to discuss problems or work through them with the teacher, and this is one way in which answers may be obtained. Part of the skill of the teacher is to help the student to progress without “spoon feeding” the answer.

Having said all of this, the Department recognises that while preparing for examinations in particular, it can be useful for students to have the final answers (rather than complete solutions) to past exam questions: this provides some confidence that the answers obtained while attempting past papers are correct. All teaching staff should provide such “final” answers routinely, for selected exam papers from 2016 onwards, via their course Moodle pages (see page 14).

## WHAT IS EXPECTED OF STUDENTS

### Student code of conduct

UCL enjoys a reputation as a world-class university. It was founded on the basis of equal opportunity, being the first English university to admit students irrespective of their faith and cultural background and the first to admit women. UCL expects its members to conduct

themselves at all times in a manner that does not bring UCL into disrepute. Students should ensure they read and familiarise themselves with UCL's Student Code of Conduct and be aware that any inappropriate behaviour may lead to actions under UCL's Student Disciplinary Procedures.

Further information:

- [UCL Student Code of Conduct](#)
- [Student Disciplinary Code and Procedure](#)

## Attendance requirements

UCL expects students to aim for 100% attendance, and has a minimum attendance requirement of 70% of scheduled learning, teaching and assessment activities. If a student does not meet this requirement they may be barred from summative assessment.

You are expected to be in attendance during the UCL terms throughout your programme of study. This includes reading weeks (see page 9). If you wish to be absent from College for some special reason, you should obtain permission *beforehand* from the Programme Director (see page 6).

If you have a good reason for needing to miss a compulsory class, you must inform the Programme Administrator and lecturer or tutor concerned in order to be excused. The Department keeps records of coursework submission and attendance at tutorials and workshops. At the end of each term, you will be required to explain an unsatisfactory attendance record to the Faculty Tutor. An inadequate explanation may lead to your studies being suspended.

You may also be taking some courses provided by other departments, where arrangements are likely to be different from those in the Department of Statistical Science. It is important that you know what is expected of you in each of these courses. *You may be barred from taking examinations if you have not attended enough tutorials or submitted enough coursework, **EVEN** if it does not count towards the final examination mark.*

The importance of attendance at lectures and other classes has been stressed above. Requests for special attention (e.g. for missed notes, handouts, problem sheets etc.) due to non-attendance without good reason (e.g. medical), do not create a good impression. The same applies to non-submission of coursework. Remember that when writing a job reference for you, we are usually asked to provide information about your attendance and punctuality, as well as your ability, etc. If you are absent from any lecture or other class, you should endeavour to copy up notes promptly.

Further information:

- [Attendance Requirements](#)
- [Barring Students from Assessment](#)

### **Tier 4 students: absence from teaching and learning activities**

In line with UCL's obligations under UK immigration laws, students who hold a Tier 4 visa must obtain authorisation for any absence from teaching or assessment activities. UCL is required to report to UK Visas and Immigration (UKVI) and engagement monitoring is undertaken by departments at regular points during a student's registration. This is not only to meet the UKVI requirements, but also to identify any problems as early as possible to ensure action is taken to advise or assist the student.

Further information:

- [Authorised Absence](#)
- [UCL Visa and Immigration pages](#)

### ***Absence from assessment***

Any student who is absent from an assessment must obtain authorisation for the absence by submitting a request for Extenuating Circumstances.

Further information:

- [Extenuating Circumstances](#)

## **Studying**

### ***Tutorials***

Tutorials in the Department of Statistical Science are *compulsory* and provide the opportunity to get personal attention. It is important to prepare yourself by reading through the latest lecture material and trying the relevant exercises sheets *before the tutorial*. Think of questions relating to the course material to ask; make a note of points that you don't understand so that you can have them clarified in tutorials. Take your recent lecture notes and exercise sheets to each tutorial, in particular those relating to material that you know will be discussed.

### ***Lectures, workshops and problem classes***

Most new material is presented in lectures; some might be introduced by your trying ideas in workshops. The workshops give the opportunity to solve problems with guidance, a helpful alternative method of learning. In most courses learning is sequential; you need to have met and understood past material in order to follow the current material. You are therefore strongly advised to attend all classes. Teaching staff and demonstrators are able to give some personal attention in workshops; absences are likely to be noted.

Staff sometimes receive complaints from students about disruption and noise (caused by other students) in large classes. All students are respectfully asked to consider others when in the classroom: excessive noise and disruption can have a negative impact on the learning experience for everybody. Any student who is persistently disruptive will be asked to leave the classroom, and will receive an official warning from their Programme Tutor with an appropriate note placed on the student's record.

### ***Coursework***

In the Department of Statistical Science regular, often weekly, coursework is set. Some of this is for in-course assessment, but much of it is to help you to learn the material being taught. You will normally receive feedback from coursework during problem classes, tutorials or workshops, as appropriate for the course. You will generally be expected to hand in your work so that we can monitor your progress. The detailed arrangements for coursework will vary between courses and you will be told about them at the start of each course. *You should ensure that you know what is required for each course that you take.*

Our teaching assumes that you have attempted the coursework, and we may refer to it in subsequent classes and coursework. *In-course assessment is compulsory: it contributes to your final examination mark for that course and non-submission may mean that you cannot pass the course* (see "Examinations" section on page 27). Furthermore, for courses with tutorial classes your tutor will record whether you have submitted each piece of non-assessed coursework by the specified deadline and whether it is a reasonable attempt (i.e. an attempt

of pass standard). The Department of Statistical Science expects a reasonable attempt for at least 70% of non-assessed coursework in each course. If you fail to satisfy this requirement you may be barred from taking the examination for the course.

Ensure that you leave yourself enough time to complete each exercise sheet. Weekly sets of exercises may well need about 5 hours work on them, including reading time. In some courses, more substantial sets of exercises are given out on a fortnightly basis: it is recommended that you start them in the *first* of the two weeks allowed. A prompt start to exercises set for in-course assessment is well advised.

It is good practice to aim for legibility, accuracy and clarity in your coursework, whether or not it is for in-course assessment (the same applies to examinations, of course!).

### **Self study**

After a lecture, study your notes carefully. Work through the details slowly and annotate your notes in a different colour to that used in taking them; this can help with revision. It is important to keep on top of each course by reviewing the appropriate notes *before the next class* (lecture, tutorial, problem class or workshop). Read supporting material from textbooks as necessary. Start coursework well in advance of the submission date (see the above comments on coursework).

The following will help you understand and communicate your understanding of course material:

- continual practice at solving problems;
- thorough preparation for all classes;
- regular revision of course material as the course progresses;
- seeking help when you have difficulties.

The Department has prepared a self-assessment questionnaire to help you to evaluate what you are getting out of your studies and to take responsibility for your own progress. This questionnaire is available on the DOSSSH Moodle page (under the Student Feedback topic). Try completing it for each course during reading week.

### **Total workload**

For a typical 15 credit course, you should expect a workload of about *9 or 10 hours per week* – this includes lectures, workshop, problems class, tutorial, reading and coursework, as appropriate for each course. For example, if you are studying the equivalent of four 15 credit courses per term, your total weekly workload is expected to be around *40 hours*.

As part of monitoring your own progress, you may find it helpful, in some weeks, to keep a diary of the time you spend actively working.

## **DEGREE PROGRAMME SPECIFICATIONS**

### **Course codes**

Each course offered in a programme has a code: this consists of a four character prefix which indicates the examination board responsible for that course, followed by another four characters indicating a course code within that board. Courses in Statistical Science have the prefix STAT (see the lists of courses that follow). However, you will often find that staff refer to course codes as simply G1 for STATG001 (for example).

## Selecting courses

Each degree programme has some compulsory courses that cover the core material. These are then supplemented through the choice of appropriate options to make up a total of 180 credits for the entire programme. To take an optional course, you must register for it on Portico. Instructions on how to do this can be found on the Portico website (log on to Portico and select the “Module registration documentation” option from within the “Module Selection” container). In choosing options, you are advised to try and balance the amount of work evenly between the two terms.

In response to feedback from students, Student and Registry Services are putting processes in place to release the timetable of centrally organised examinations earlier in 2017/18. As a result, it is necessary to bring the deadline for the confirmation of module choice forward. All modules you intend to take in 2017/18, including modules for term 2, must be confirmed on Portico by 6 December 2017.

You will not be able to change your term 2 module selection after 6 December. It is therefore essential that you make sure you research your module choices thoroughly before selecting them. If you want to make a change after you have confirmed your module choices, please consult the MSc Tutor. Changes can be made by the Programme Administrator and you will need to request any changes to your term 2 module registrations in good time before the deadline.

## MSc Data Analytics for Government

### *Aims and objectives*

To impart deep understanding of the current and emerging range of data science tools, techniques, technologies and methodologies that are impacting many sectors of public life, from retail to healthcare, and will come to shape the future of national statistics itself.

- To supply a robust theoretical framework, covering the essential mathematics, statistics and computer science required to understand the populations from which data are drawn, and to develop and implement effective and efficient algorithms.
- To instil the importance of good survey design, to ensure that data collected are appropriate for a particular issue of interest.
- To develop an understanding of how to manage data that are unstructured, varying in format, collected over time and/or space, and to mine data of interest from wider collections.
- To give students an understanding of the computational infrastructure (hardware and software) that supports data storage, processing and analysis.
- To hone students' ability to collect, process, analyse and produce interpretable outputs from data, drawing upon fundamental principles of data storytelling and selecting appropriate tools for visualisation.
- To enable students to better understand and appreciate the connection between national statistics and government policy, and the new opportunities and the new opportunities data science presents at this interface.

## **Curriculum**

### *Compulsory*

Course Code	Course Title	Term
STEP0020	(Statistics in Government) Analytic Methods for Policy	2
STAT0032	(Data Science Foundations) Introduction to Statistical Data Science	1
STAT0029	(Survey Fundamentals) Statistical Design of Investigations	1
MSIN0143	(Statistical Programming) Programming for Business Analytics	1
STAT0033	Dissertation – MSc Data Analytics for Government	

### *Optional*

Choose four courses:

Course Code	Course Title	Term
SOCS0054	(Introduction to Survey Research) Survey Design	1
SOCS0056	(Survey Data Collection) Introduction to Longitudinal Data and Analysis	2
STAT0028	(Regression Modelling) Statistical Models and Data Analysis	1
STAT0030	Statistical Computing	1 & 2
STAT0031	(Bayesian (probabilistic methods) Applied Bayesian Methods	2
STAT0010	(Time Series Analysis) Forecasting	2
STAT0008	(Further Survey Estimation Methods) Statistical Inference	1
STAT0017	(Advanced Statistical Modelling) Selected Topics in Statistics	2
CASA0003	Digital Visualisation	2
CASA0005	(Spatial Analysis) GIS Mapping and Spatial Statistics	1
INST0060	Foundations of Machine Learning and Data Science	2

You may be able to take one or two modules not listed here. As the programme develops more options will be added to the list and there is also the possibility of you taking an *elective*. An elective can be taught anywhere in UCL. However, your registration is subject to there being enough space, and that you meet any academic prerequisites.

*Your registration for any elective course is subject to approval both by the Programme Director and by the department offering the module. Attempts to register for unsuitable modules will be rejected. If you are in any doubt as to whether you will be allowed to take a particular course, you should discuss it with the Programme Director and the teaching department, **BEFORE** attempting to register for it on Portico.*

### ***Flexible study***

The MSc Data Analytics for Government is run on a flexible study basis. The MSc can be completed over a period of 2-5 years. Students need to choose their modules and enrol in the Autumn term each year, even if the only courses they are taking that year occur in the Spring term.

## **MSC PROJECT**

### **Guidelines for preparation and submission**

Once the taught part of the programme is completed, students may embark on the MSc Project. The project must be completed to the same timescale as students attending the programme full-time (i.e. in the period June-September in the final year of the programme).

Students should plan to take a short break after their written examinations, before starting work on their projects. All supervisors are likely to be away from time to time during the period June-September, attending conferences or on holiday. Students should therefore see their supervisors as soon as their examinations are over, to make mutually convenient arrangements for starting work on their projects.

Over the course of the project, student and supervisor should arrange to meet regularly (about once a week, whenever possible) and should agree a suitable timetable for completing the work and producing a written account. The supervisor should advise the student to start to write up the work, and to ask for the supervisor's feedback on their writing, early in this period.

Supervisors will provide feedback on an entire draft of the project dissertation on at least one occasion, providing it is available in at least three weeks before the deadline for submission. Any request for feedback after this deadline is at the discretion of the supervisor. Supervisors should provide feedback within two weeks.

Final (word-processed) dissertations should be handed in to the Departmental Office by 16:00 on the advertised date (this is normally at the start of September). Late submissions will incur severe "lateness" penalties (see "Late Submission Penalties" section on page 28). Furthermore, an electronic version of the dissertation should be submitted via Moodle on the same day (the MSc Tutor will circulate more detailed instructions nearer to the date).

The length of a project dissertation will depend on the topic of the project and may vary considerably. Lengths between 8,000 and 15,000 words (excluding computer programs, tables, graphs, formulae and other output) are generally acceptable. Typical projects are between 10,000 and 12,000 words long.

Each dissertation should include a table of contents, an introduction, a conclusion or discussion section, and a list of references. The reference list should include all references that have been used to support the work reported in the project; and these references should be cited in the text of the dissertation as appropriate to indicate where they have been used, following accepted conventions for citation. The pages should be clearly numbered and should have a left-hand margin of at least 2cm. Examiners attach *considerable* importance to accuracy, clarity and overall quality of presentation.

In addition to the project dissertation, each student will be required to give a presentation on their research. The time normally allocated to each presentation is 15 minutes excluding questions. Students are expected to attend and actively participate in the oral presentations

by other students. Presentations normally take place in early September; students therefore need to ensure that they are available in the Department at this time.

Specific dates for the arrangements referred to in the third and fourth bullet points above will be provided separately. *Please ensure that you are aware of them.*

## **Guidelines for assessment**

Project dissertations are read independently by two examiners, one of whom is normally the candidate's project supervisor. Each examiner provides a brief written assessment. Dissertations are also read by a visiting examiner. The final mark is agreed by the whole exam board, which includes the visiting examiner. It is possible, but not usual, that a student may be required to take an oral examination before a final mark is assigned. The final mark should be interpreted in accordance with the guidance notes on page 15.

Examiners will satisfy themselves that the dissertation is the work of the candidate, and will take into account the following points:

- the difficulty and novelty of the project;
- the amount of new methodology/ application knowledge that the student was required to learn;
- the degree of direction required from the project supervisor;
- the student's progress throughout the project.

Subject to these overall criteria, examiners will consider both the content of the dissertation and its presentation, with a higher priority being attached to content. Aspects considered will usually include the following:

- *Content*: amount of work done; extent to which understanding has been demonstrated; quality and accuracy of reasoning, validity of interpretation, relevance of conclusions; critical appraisal, discussion of limitations and suggestions for further work; clarity of objectives; quality of literature review; quality of data organisation and collection (if applicable); quality of programming or use of software (if applicable).
- *Presentation*: layout of dissertation and care in its presentation; structure of the dissertation; use of appropriate judgement in selecting material; clarity of expression, readability and coherence; correctness of grammar and spelling; adequacy of diagrams, graphs and tables (if applicable); quality of presentation of mathematical material (if applicable).

A mark less than 50 will be awarded if the material, though correct, is judged to be wholly reproduced in a purely technical manner.

For a mark over 85, it is expected that the student, in addition to having submitted a well-presented dissertation demonstrating a good understanding of the material and a comparatively high amount of work, will also have shown some initiative rather than simply following instructions. Marks of 90 or more may be appropriate where in addition the technical or conceptual difficulty of the material is very high, or where some of the work could be considered original research on the part of the student.

The length of project dissertation will depend on the topic of the project and may vary considerably. Lengths between 8,000 and 15,000 words (excluding computer programs, tables, graphs, formulae and other output) are generally acceptable. Typical projects are between 10,000 and 12,000 words long. Over-length dissertations will be penalised (see page 28). It is generally required that the amount of work done and demonstrated is high enough, and that the material is presented in a way understandable to fellow students with a



comparable background (so 8,000 words may only be an appropriate length for a very theoretical or densely presented dissertation). On the other hand, dissertations should not be too repetitive or contain unnecessary or irrelevant details, which may lead to downmarking. Although the word counts given above exclude appendices, tables and program listings, these items will also be penalised if they are excessive.

Each project presentation will be assessed by two examiners. Normally, neither of the examiners will be the candidate's supervisor. The examiners make independent notes on the presentation prior to discussing and agreeing a mark. Aspects considered will usually include the following:

- *Content*: was the presentation interesting? Did it focus on the important aspects of the work and flow logically? Was there sufficient detail to be intelligible to statistically literate listeners who do not have an in-depth knowledge of the specific topic? Were there clear aims and conclusions?
- *Presentation skills*: was the verbal presentation confident and clearly audible with varied inflexion? Did the presentation engage with the audience? Were visual aids clear, well produced and well used? Were questions handled appropriately? Was the amount of material appropriate for the time allowed?

## **EXTENUATING CIRCUMSTANCES AND REASONABLE ADJUSTMENTS**

### **Illness and other Extenuating Circumstances**

UCL recognises that some students can experience serious difficulties and personal problems which affect their ability to complete an assessment such as a sudden, serious illness or the death of a close relative. Students need to make sure that they notify UCL of any circumstances which are unexpected, significantly disruptive and beyond their control, and which might have a significant impact on their performance at assessment. UCL can then put in place alternative arrangements, such as an extension or a deferral of assessment to a later date. The Extenuating Circumstances Panel will determine the nature and timing of the deferral, which may be offered with or without tuition/ attendance.

### **Reasonable adjustments**

UCL will make Reasonable Adjustments to learning, teaching and assessment to ensure that students with a disability are not put at a disadvantage. UCL also provides Reasonable Adjustments for students who might not consider themselves to have a 'disability' but who nevertheless would benefit from additional support due to an ongoing medical or mental health condition. It is the responsibility of the student to request Reasonable Adjustments, and students are encouraged to make a request as early as possible.

Further information:

- [Reasonable Adjustments](#)
- [Student Disability Services](#)

## Special examination arrangements

Special Examination Arrangements (SEAs) are adjustments to central or departmental written examinations which can be made as a Reasonable Adjustment for students with a disability or longer-term condition or as a form of mitigation for students with shorter-term medical Extenuating Circumstances. This may include, but is not limited to extra time, a separate room, rest breaks and specialist equipment. Students must make an application to use the special examination facilities.

Further information:

- [Special Examination Arrangements](#) – guidance and forms
- [Special Examination Arrangements](#) – regulations

Any special arrangements that are agreed for you will automatically be taken into account in all centrally-organised exams held during the main exam period in term 3. However, in order to have your requirements taken into account for any departmentally-organised assessments held outside the main exam period, you must provide the relevant department with a copy of your letter *in advance of the test date*.

## Extenuating circumstances

Extenuating circumstances are defined by UCL as circumstances in a student's life that are unexpected, significantly disruptive and beyond the student's control and which may affect their performance at assessment. Wherever possible, UCL is responsible for ensuring that students are not unfairly disadvantaged by such circumstances by putting in place alternative arrangements, such as an extension or a deferral of assessment to a later date.

The extenuating circumstances regulations provide short-term solutions for students experiencing sudden, unexpected difficulties. They are not designed to support students with longer-term or chronic conditions or disabilities. UCL seeks to ensure that such students are enabled to achieve their full potential at assessment by putting in place appropriate special examination arrangements (see the previous section).<sup>1</sup>

Examples of extenuating circumstances that would commonly be regarded as having seriously affected a student's performance are:

- death of, or serious injury to, a close relative;
- a serious personal injury or medical condition;
- being the victim of a serious crime (e.g. assault, mugging);
- theft of work required for assessment.

Examples of circumstances that would not normally be considered are:

- minor illnesses or injuries (e.g. colds, headaches, hay fever);
- assessment / examination stress (e.g. because of tight exam timetabling);
- failure of IT equipment / printers;
- minor private or public transport failure.

However, these lists are by no means exhaustive and additional guidance on the types of claims that might be considered is available from the UCL Academic Manual: [https://www.ucl.ac.uk/silva/srs/academic-manual/documents/annexes\\_2017\\_18/](https://www.ucl.ac.uk/silva/srs/academic-manual/documents/annexes_2017_18/)

---

<sup>1</sup> It is, however, recognised that a student with a chronic or long-term condition may nonetheless experience an acute episode or sudden worsening of their condition, or that the condition might be newly-diagnosed. Such students are encouraged to seek support through Student Disability Services, but may also need to submit an extenuating circumstances claim if, for example, there is insufficient time to put special examination arrangements in place.

[chapter 4 annexes 17 18/Annex-4.1.1-Grounds-for-Extenuating-Circumstances.pdf](#).

Furthermore, UCL recognises that each student's circumstances are different and that claims must be considered on a case-by-case basis.

You are responsible for making known any circumstances which may affect your performance in good time for them to be considered by the appropriate UCL body. You must complete an Extenuating Circumstances Claim Form (available from the DOSSSH Moodle page) and submit this, together with appropriate supporting evidence, to the Teaching Administrator as soon as possible and **NO later than one week after the circumstance has taken place**. Claims must clearly state the modules / components for which you are seeking mitigation; claims will not be considered for any modules not identified on the claim form.

Claims must be supported by written evidence from an appropriate, verifiable and independent authority such as a registered medical practitioner, solicitor, undertaker, registrar of births, marriages and deaths, police officer, fire officer, court or tribunal officer. Evidence must cover the full period for which you are claiming mitigation and must be provided in English or accompanied by a translation formally notarised by a solicitor. If you are unable to obtain evidence in order to submit your claim within the one week deadline, you should submit the claim on time, indicating on the form that the evidence is to follow.

Depending on the type of mitigation being requested, your claim will be reviewed by relevant members of staff from the Department and / or MAPS Faculty, who will make a decision either to accept or reject the claim, or to request additional evidence. You will be notified in writing within one week of the decision being made. Where a claim is accepted, the notification will include details of the mitigation to be applied. Where further evidence is required, you will be expected to provide this within a further two weeks.

*Unless you follow the above procedure, it will **NOT** be possible for the examiners to take any extenuating circumstances into account.* Details of the precise circumstances affecting individual students are not made available to all examiners.

Further information:

- [Extenuating Circumstances Regulations](#)

## **Support to study policy and fitness to study procedure**

Students with physical or mental health concerns are encouraged to make contact with the available support services as early as possible so that UCL can put in place reasonable adjustments to support them throughout their studies. However there may be occasions when a student's physical or mental health, wellbeing or behaviour is having a detrimental effect on their ability to meet the requirements of their programme, or is impacting on the wellbeing, rights, safety and security of other students and staff. In such cases UCL may need to take action under the Fitness to Study Procedure.

Further Information:

- [Support to Study Policy](#)
- [Fitness to Study Procedure](#)
- [Student Psychological Services](#)
- [Student Support and Wellbeing](#)
- [Learning Agreements, Barring, Suspensions and Terminations of Study](#)
- [Student Disciplinary Code and Procedures](#)
- [UCL Student Mental Health Policy](#)

# EXAMINATIONS

## Complete and non-complete courses

In order to qualify for the award of a Masters degree, students must have completed 180 UCL credits. Unless there are strong mitigating circumstances (e.g. medical), you will be non-complete for a particular course if:

- you are absent from the final examination, or make little or no attempt;
- you fail to submit a piece of coursework worth more than 20% of the overall mark.

You may also be declared non-complete in a course if your attendance is insufficient or you don't hand in enough non-assessed coursework (see page 18). To avoid being non-complete for a particular course through absence from an assessment, students must obtain authorisation for the absence by submitting a request for extenuating circumstances (see "Extenuating Circumstances" section on page 25).

## Components of compulsory assessment

Details of each component of compulsory assessment and the proportion it normally contributes towards the final mark are given for each course in the "Course Information" section from page 44 onwards.

### ***In-course assessment***

At the beginning of each course, the lecturer will provide details of the method and dates of in-course assessment and the amount of work involved. The assessment dates will also be posted on the course Moodle page. Students should ensure that they have no other commitments on these dates; *in-course assessment is a form of examination, and should be treated as such*. For students required to resit the in-course assessment during the late summer, an alternative form of assessment may be employed for the second attempt.

Each piece of in-course assessment set by the Department of Statistical Science has its own rubric and the instructions given must be followed. *In particular, do pay attention to the consequences of missing the deadline set, non-submission and plagiarism; any of these can result in your not passing the course*. Teaching staff will set aside extra office hours to discuss assessment-related matters (see page 12) students should respect the lecturers' time by confining queries to these hours.

Some assessments will be in the form of a "take-home" assignment, to be handed in to the Departmental Office or the course lecturer by a set deadline. For such assessments, you will need to sign a cover sheet (provided by the course lecturer) containing a declaration that the submitted work is entirely your own (see "Plagiarism and collusion" section on page 29). You will also need to submit your work in a *single securely stapled bundle* including the cover sheet.

**Late Submission Penalties:** Planning, time-management and the meeting of deadlines are part of the personal and professional skills expected of all graduates. For this reason, UCL expects students to submit all coursework by the published deadline date and time, after which penalties will be applied. If a student experiences something which prevents them from meeting a deadline that is sudden, unexpected, significantly disruptive and beyond their control, they should submit an Extenuating Circumstances Form (see "Extenuating Circumstances" section on page 25). If the request is accepted, the student may be granted an extension. If the deadline has already passed, the late submission may be condoned i.e. there will be no penalty for submitting late.

Further information:

- [Late Submission Penalties](#)

**Word counts:** some assessments (usually involving the production of reports) carry a specified word count. The rubric will include clear instructions about word counts, the inclusion of footnotes, diagrams, images, tables, figures and bibliographies etc. Students are expected to adhere to the requirements for each assessment. Students exceeding these parameters may receive a reduction in marks.

Further information:

- [Word Counts](#)

The rubric may indicate that the word count excludes appendices. *However, this should not be regarded as an invitation to transfer large amounts of surplus text into an appendix and the mark awarded will reflect the standard of judgement shown in the selection of material for inclusion.*

### **Written examinations**

These normally take place during term 3. Student and Registry Services will contact you with details of your personal examination timetable, normally just before the end of term 2.

Students must ensure that they are aware of the regulations governing written examinations detailed in the *UCL Examination Guide for Candidates* on the [Examinations and Assessment website](#). Students should pay particular attention to the regulations around examination irregularities. Students who are suspected of any form of cheating or of breaching the Examination Regulations will be investigated under UCL's Examination Irregularities and Plagiarism procedures (see "Examination Irregularities" section on page 31).

Further information:

- [Examination Regulations](#)

In most examinations set by the Department of Statistical Science, there are two sections and candidates are required to answer all questions. The questions in section A are intended to be straightforward and to focus on core material, whereas those in section B are more challenging. The rubric will indicate the proportion of the total mark allocated to each section. Statistical tables will be provided by the College in all examinations set by the Department (the currently provided tables are *New Cambridge Elementary Statistical Tables* by D.V.Lindley & W.F.Scott). You should take a pocket calculator to all of these examinations (see page 14 for details of permitted calculators).

Recent past examination papers are available for consultation on the UCL Library Services website: [http://digitool-b.lib.ucl.ac.uk:8881/R/?local\\_base=EXAMPAPERS](http://digitool-b.lib.ucl.ac.uk:8881/R/?local_base=EXAMPAPERS).

### **Final course mark**

To pass a course at Masters level, a final mark of at least 50 is required. For courses with more than one assessment component, a guideline is given later in this handbook to indicate the scheme used for combining the individual marks. This guideline will normally be adhered to, but is subject to change at the discretion of the Board of Examiners.

## **UCL Feedback Turnaround Policy**

Regular feedback is an essential part of every student's learning. It is UCL policy that all students receive feedback on summative assessments within one calendar month of the submission deadline. This feedback may take the form of written feedback, individual discussions, group discussions, marker's answers, model answers or other solutions

(although students should note that UCL is generally unable to return examination scripts). Students writing dissertations or research projects should also expect to receive feedback on a draft on at least one occasion.

If, for whatever reason, a department/division cannot ensure that the one calendar month deadline is met then they will tell students when the feedback will be provided - it is expected that the extra time needed should not exceed one week. Where feedback is not provided within the timescale, students should bring the matter to the attention of their Programme Tutor or Head of Department.

Further information:

- [UCL Feedback Turnaround Policy](#)

## Plagiarism and collusion

Plagiarism means attempting to pass off someone else's work as your own, while collusion means passing off joint work as your own unaided effort. Both are unacceptable, particularly in material submitted for examination purposes including exercises done in your own time for in-course assessment. Plagiarism and collusion are regarded by the College as examination irregularities (i.e. cheating) and are taken extremely seriously. UCL uses a sophisticated detection system (Turnitin<sup>®</sup>) to scan work for evidence of plagiarism and collusion, and the Department reserves the right to use this for assessed coursework. This system gives access to billions of sources worldwide, including websites and journals, as well as other work submitted to the Department, UCL and other universities. It is therefore able to detect similarities between scripts that indicate unacceptable levels of collusion, as well as material taken from other sources without attribution.

If plagiarism or collusion are suspected, on the basis either of the Turnitin<sup>®</sup> software or other evidence, it can be dealt with informally only in the case of first offences. All other cases must be dealt with formally, which involves adjudication by a departmental panel and/or College Examinations Irregularities panel (see "Examination Irregularities" section on page 31).

### ***What isn't acceptable?***

Students sometimes find it difficult to know what counts as plagiarism or collusion. The following list is not exhaustive, but gives some indication of what to avoid. It is based on guidelines developed by Nick Hayes of the UCL Pharmacology Department. You may **NOT**:

- Create a piece of work by cutting and pasting material from other sources (including websites, books, lecture notes and other students' work).
- Use someone else's work as your own. This includes, but is not limited to:
  - Making notes while discussing an assessment with a friend, and subsequently using these as the basis for all or part of your submission.
  - Telephoning another student to discuss how best to carry out a particular piece of analysis.
  - Employing a professional ghostwriting firm or anyone else to produce work for you.
- Use somebody else's ideas in your work without citing them.
- Ask a lecturer in the department for help with assessed work, unless you make it clear to them that the work is assessed.
- Help another student with their assessed work. If you do this, you will be deemed to be guilty of an examination irregularity.



### ***What is acceptable?***

The following practices do not constitute plagiarism / collusion:

- Quoting from other people's work, with the source (e.g. book, lecture notes, website) clearly identified and the quotation enclosed in quotation marks.
- Summarising or paraphrasing other people's work, providing they are acknowledged as the source of the ideas (again, usually this will be via a reference to the book, journal or website from which the information was obtained).
- Asking the course lecturer for help with difficult material, providing it is clear that the question is in connection with the assessment. The lecturer will be able to judge for him or herself what is an appropriate level of assistance.

### ***Some examples***

Unfortunately, each year there are some students in the Department of Statistical Science who submit work that contravenes the regulations. The consequences can be severe.

**Example 1:** Final-year student A had a lot of coursework deadlines in the same week as an important job interview. One of the coursework deadlines was for an extended piece of data analysis, set two weeks previously. Because of his other commitments, student A did not start this piece of coursework until shortly before the deadline, at which point he discovered that he did not have enough time to do it. He asked student B for help. The result was that both students submitted essentially identical work using exactly the same computer output. A departmental panel was convened to investigate the matter. The panel suggested that student B had passed electronic material (computer output and graphics files) to student A, who had pasted this material straight into his own submission. Although student A admitted asking student B for help, both students denied exchanging electronic material. They were, however, unable to explain how the same electronic files came to appear in both submissions. As a result, the allegation was upheld and both students were penalised. Student A was recorded as "non-complete" for the course in question (this meant that he had no possibility of passing it that year), and student B was given a mark of zero for the coursework component.

**Example 2:** Students C and D both had to submit some computer code for an assessment, which was worth one third of the total mark for a course. There was considerable flexibility in how to go about the assessment. Although the students submitted code that looked very different, closer inspection revealed that they were carrying out the same procedures in more or less the same order, and that the methods they used to carry out these procedures were essentially the same. Further, these procedures and methods were not used by other students in the class. On investigation, it transpired that the students had discussed the assessment over the phone while sitting in front of their computers. This is unacceptable, and as a result the marks of both students for this piece of assessment were halved.

**Example 3:** The in-course assessment for a particular module was organised as a multiple choice exam taken via Moodle outside of lessons. Each student could attempt the one-hour exam at any time of their choosing within a ten day window, but were clearly advised that they must work alone. After the exams had been graded, it was noticed that students E and F had given identical answers to every question (including incorrect answers). Inspection of the Moodle logs revealed that the students had started and finished their attempts at exactly the same time, using IP addresses that were traced to adjacent PCs in the same computer cluster. Students E and F admitted colluding on the in-course assessment and were both given a mark of zero.

## ***How to avoid plagiarism and collusion***

If you are found to have committed an offence of plagiarism or collusion, it makes no difference whether or not you intended to do so. Ignorance is no excuse. To avoid committing an offence, a useful rule of thumb is: if in doubt, don't do it. Make sure that any work you submit is your own unaided effort. More specific guidance is as follows:

- Plan your work schedule carefully, to allow enough time to complete each piece of assessment.
- If you have genuine problems in meeting a deadline, don't take the easy way out and borrow a friend's work. Discuss your difficulty with the course lecturer in the first instance.
- If you are stuck with an assessment, don't ask another student for help. Discuss it with the course lecturer.
- If another student asks you for help with an assessment, or asks to see your work, suggest that they approach the course lecturer instead. Remember: if somebody else copies or uses your work, you will be penalised as well, even if you didn't expect them to use your work in this way.

More information can be found at <http://www.ucl.ac.uk/current-students/guidelines/plagiarism>, and in the UCL Library Services WISE courses (see page 13).

## **Examination irregularities**

UCL students are expected to be aware of and adhere to UCL's referencing and examination requirements as a condition of their enrolment:

- **For examinations**, the *UCL Examination Guide for Candidates* is published annually on the Examinations and Awards website. All candidates for written examinations must ensure they are familiar with the requirements for conduct in examinations set out in this guide.
- **For coursework submissions**, students must ensure that they are familiar with the UCL Library Guide to References, Citations and Avoiding Plagiarism which provides detailed guidance about UCL's referencing and citation requirements. Students should also ensure that they are familiar with the specific referencing requirements of their discipline.

Any student suspected of examination misconduct, plagiarism, self-plagiarism, collusion, falsification or any other form of academic misconduct which is likely to give an unfair advantage to the candidate and/or affect the security of assessment and/ or compromise the academic integrity of UCL will be investigated under the Examination Irregularities and Plagiarism procedures. If misconduct is found, students are likely to be failed for that assignment and/ or module. Serious or repeated offences may lead to failure of the whole year, suspension or even expulsion. A breach of copyright or intellectual property laws may also lead to legal action.

Further information:

- [UCL Examination Guide for Candidates](#)
- [Library Guide to References, Citations and Avoiding Plagiarism](#)
- [Examination Irregularities and Plagiarism procedures](#)
- Students can also seek advice from the [Students' Union Advice Service](#)



## **Examination marks**

### ***Marking, second-marking and moderation***

All work that is submitted for summative assessment is marked by a UCL Internal Examiner or Assistant Internal Examiner. All UCL programmes also include rigorous second-marking and internal moderation processes to ensure that marking is consistent and fair. Second-marking can take a number of different forms depending on the type of assessment, but the overall aim is to ensure that marking is as accurate as possible. Internal moderation also helps UCL to ensure that marking is equitable across different modules, pathways, options and electives.

### ***External examining at UCL***

External Examiners are senior academics or practitioners from other universities who help UCL to monitor the quality of the education we provide to our students. In particular, External Examiners scrutinise the assessment processes on each programme, helping UCL to ensure that all students have been treated fairly, that academic standards have been upheld and that the qualifications awarded are comparable with similar degrees at other UK universities.

Each External Examiner submits an annual report. Faculties and departments are required to reflect on any recommendations and address any issues raised in a formal response. The report and response are discussed with Student Reps at the Staff-Student Consultative Committee, and are scrutinised by faculty, department and institution-level committees. Students can access their External Examiner's report and departmental response via their Portico account or by contacting their Departmental Administrator in the first instance or Student and Registry Services directly at [examiners@ucl.ac.uk](mailto:examiners@ucl.ac.uk).

### ***Boards of examiners***

Module marks are finalised at meetings of examiners in the departments offering the courses. When finalising the marks, examiners in the Department of Statistical Science refer to the grade descriptors summarized in the "Feedback on student work" section on page 15.

*Provisional* results for the taught component and *provisional* award recommendations for postgraduate students registered in the Department of Statistical Science are released after the appropriate examiners' meetings, normally in June and November respectively. These results are provisional until confirmed by the College Examination Board later in the year and will be published online via the DOSSSH Moodle page. To access the provisional results online you will need your candidate ID number, along with your UCL user ID and password. Students will be advised of the release date in advance via UCL email.

## **Appeals concerning examination results**

Where informal resolution is not possible, candidates may appeal against their examination results under one or more of the following conditions:

- Either the examination and/ or classification process was not conducted in accordance with the relevant regulations/ procedures.
- The examiners could not reasonably be made formally aware of special circumstances (e.g. illness) notified by the candidate which significantly affected his/ her performance in the examination. For a candidate to appeal on these grounds, it is necessary to demonstrate that they could not reasonably have submitted the appropriate claim for extenuating circumstances by the required deadline (see page 25).
- There has been an arithmetical or transcription error in the compilation of the marks and/ or the result.

- There is substantive evidence that one or more of the examiners can be shown to have been biased or prejudiced against the candidate in one or more specific examinations.

Any such appeal should be pursued via the Student Complaints Procedure (see page 40). *Note that appeals will **NOT** be considered except under one or more of the conditions above.* The Department of Statistical Science would therefore like to reassure all students that all staff in the Department take the assessment process extremely seriously. The marking process described above is designed to ensure that papers are marked fairly and accurately, with all marks agreed by at least three examiners (two internal and one external) and any difficulties discussed by the entire Board of Examiners.

## Reassessment

The Programme Summary describes the modules which students must pass in order to achieve their degree. Where a student fails to meet these requirements the Consequences of Failure regulations in the UCL Academic Manual (Chapter to be confirmed) apply.

If a student fails one or more modules the Board of Examiners may offer them a Reassessment opportunity. Depending on the amount of failure, this may take the form of either a Resit in the Late Summer or a Repeat in the following academic session. The marks for modules successfully completed at the second attempt will be capped at the Pass Mark - 40% for modules at UG Level/ Levels 4, 5 and 6; 50% for PGT modules at Masters Level/ Level 7. Students are permitted a maximum of two attempts at any given assessment.

If an assessment has been affected by Extenuating Circumstances (ECs) students may be offered a Deferral i.e. a 'new first attempt' or a 'new second attempt'. If the student successfully completes a Deferral of their first attempt, their module marks will not be capped. If the student successfully completes a Deferral of their second attempt (i.e. they have ECs on a Resit or Repeat), their module marks will be capped at the Pass Mark (i.e. the existing cap will not be removed).

There are some circumstances in which students will not be offered another attempt:

- If students are eligible for Condonement their marks will be Condoned and they will not be offered a Resit (however if a student has Extenuating Circumstances the Condonement Criteria won't be applied until all Deferrals are complete).
- Students cannot be reassessed in a passed module (unless they have valid Extenuating Circumstances).
- Students might not be allowed a second attempt if they have been excluded for academic insufficiency, academic misconduct or disciplinary issues.

Taught Postgraduate students:

Students who fail a Masters dissertation/ research project will normally resit by 31 January (30 April for January-start programmes). Exceptionally, the Exam Board may decide that the extent of failure is such that the student needs to Repeat the dissertation with tuition and fees.

Further information:

- [Consequences of Failure](#)

## **SCHEME FOR THE AWARD OF AN MSc**

The award of an MSc is based on marks for two elements: eight taught courses consisting of core and approved optional modules taken by the candidate (as detailed in the “Degree Programme Specifications” section beginning on page 19) and a research project.

For the award of an MSc, a student must pass all modules including the project. The pass mark is 50. The final mark for the programme will be computed as a 2:1 weighted average of marks for the taught component and project, respectively, with the taught component mark calculated as a straight average of marks from the eight taught courses.

The award of an MSc with Merit will be made if the overall mark is at least 60, the mark for the project is at least 60, but the criteria for the award of a Distinction have not been met.

The award of an MSc with Distinction will be made if the overall mark is at least 70 and the mark for the project is at least 70.

For students failing up to two taught courses with marks in the range 40-49, an MSc may be awarded at the discretion of the examiners, taking into account performance in other courses. Taking the lead from the [QAA subject benchmark statement](#), which covers Masters-level programmes and which acknowledges that students may fail modules but still be worthy of reward (see Sections 4.16 and 4.17), the Board of Examiners in Statistics will normally recommend the award of an MSc in such circumstances unless there are very strong reasons not to do so. However, any candidate registered on the MSc Statistics (Medical Statistics) programme who is eligible to benefit from this concession, but who has achieved marks in the range 40-49 for both STATG015 and STATG016, will instead be awarded an MSc Statistics, i.e. the Medical specialisation will not be recognised in the award title.

## **CHANGES TO REGISTRATION STATUS**

Students wishing to make changes to their registration status should first discuss their plans with their Personal Tutor or Programme Tutor who can explain the options available and help students to make the right decision. Students should also ensure that they read the relevant sections of the UCL Academic Manual before making any requests to change their academic record.

Further information:

- [Changes to Registration Status](#)

### **Changing programme**

If a student wishes to transfer from one UCL degree programme to another, they must make a formal application. The normal deadline for change of degree programme during the academic session is 31 October each year. Students should log in to their Portico account and complete the online application under the 'C2RS Home' menu. Students are strongly advised to discuss their plan with the departments involved before requesting a change of programme on Portico.

Further information:

- [Programme Transfers](#)

### ***Tier 4 students and changing programmes***

Only some Tier 4 students are permitted to change their programme at UCL without first completing their previous programme. There are some circumstances where a Tier 4 student is permitted to change programme, however please be aware that this could affect your current Tier 4 visa and you could be required to apply for a new visa from outside the UK. Changing to a programme at a lower level than your previous/ current programme is not permitted under Tier 4 regulations.

If you are thinking of changing programmes at UCL and you hold a Tier 4 visa, please get in touch with the Visa Compliance Team for further information: [visacompliance@ucl.ac.uk](mailto:visacompliance@ucl.ac.uk).

### **Interruption of studies**

If a student requires a temporary break from their studies and plans to resume their programme at a future date, they must apply for a formal Interruption of Study.

Further information:

- [Interruption of Study](#)

### **Withdrawing from a programme**

If a student wishes to leave their degree programme prior to completing their final examinations they must apply for a formal withdrawal from their studies. Once withdrawn, the student cannot return to the programme at a later date. Applications must be made in advance of the effective date of change. Students should log in to their Portico account and complete the online application under the 'C2RS Home' menu.

## **STUDENT SUPPORT AND WELLBEING**

### **Central wellbeing and support services**

UCL is committed to the wellbeing and safety of its students and tries to give assistance wherever possible to ensure that studying at UCL is a fulfilling, healthy and enjoyable experience. There is a wide range of support services for students - the [Current Students Support](#) website provides more information. Students should be aware that, while there are many services on offer, it is their responsibility to seek out support and they need to be proactive in engaging with the available services.

#### ***The Student Centre***

The Student Centre provides front-line administrative services to UCL students and is an excellent source of information about the services provided by Student Support and Wellbeing. They can also provide advice about a range of Student Records enquiries and fulfil requests for proof of student status.

Further information:

- [Student Centre website](#)

#### ***Student Disability Services***

Student Disability Services provide a comprehensive range of support services for students who have a disability which impacts upon their studies at UCL. They support students with physical and sensory impairments, specific learning difficulties, autistic spectrum disorders,

mental health difficulties, and long-term health conditions. As well as arranging for adjustments to learning environments, the team loan out specialist equipment and provide one-to-one tutoring and support for students with specific learning difficulties.

Further information:

- [Student Disability Services](#)

### ***Student Psychological Services***

Student Psychological Services is dedicated to helping UCL students with personal, emotional and psychological concerns. The Student Psychological Services Team is diverse and consists of a variety of highly trained and experienced professionals, who offer short-term CBT and psychodynamic support. There are currently two psychiatrists and ten therapists on staff with varying kinds of psychological training and expertise.

Further information:

- [Student Psychological Services](#)

### ***International student support and welfare***

The International Student Support and Welfare Team provide specialist support and advice for all non-UK students at UCL. As well as immigration information, they help to support students through the transition to university in the UK by organising the International Student Orientation Programme (ISOP) at the start of each term, and arranging regular workshops for international students which tackle particular issues.

Further information:

- [International Student Support and Welfare](#)

### ***Accommodation***

UCL Accommodation provides a range of housing options which includes two Halls of Residence (catered), self-catered Student Houses and Intercollegiate Halls (both catered and self-catered) shared with other colleges of the University of London. Each Hall has a designated Warden supported by a number of live in Student Residence Assistants to provide support for students and to foster a positive environment within the accommodation.

Further information:

- [Wardens and Vice Wardens at UCL Residences](#)

### ***Financial support***

At UCL we understand students can face a range of financial issues. We aim to help and advise students as much as possible, so that they have more control over their own financial situation. The Student Funding Team offer online information and one-to-one support through appointments as well as a drop-in service. Students with a more complex or sensitive circumstances can make an appointment with the Student Funding Welfare Adviser.

Further information:

- [UCL Financial Support](#)

### ***Student of Concern***

There are many sources of support for students who are having difficulties, but sometimes it is hard to know how to help a student who appears to be struggling, particularly if they seem

unwilling or unable to seek the help they need. Anyone concerned about the behaviour of a student, who believes the problem may be related to health and wellbeing issues, is encouraged to complete the online [UCL Student of Concern Form](#). Depending on the concerns raised, Student and Registry Service may respond by offering support or advice to the student or the person who submitted the form, liaise with support services or, if necessary, work with the relevant authorities to ensure the student is safe.

Further information:

- [Student of Concern](#)

## **Registering with a doctor and out-of-hours support services**

### ***Registering with a doctor***

Students are strongly encouraged to register with a doctor as soon as possible after they arrive in London so that they can access healthcare as quickly as possible if they become ill or injured. When attending a university in the UK students are also advised to be vaccinated against Meningitis C.

The Ridgmount Practice is a National Health Service (NHS) practice providing healthcare and dental services for students living within its catchment area (i.e. near the main UCL campus). Students can also choose to register with a practice closer to where they live if they prefer. The Ridgmount Practice also runs a Walk-in Surgery which any UCL student can attend, even if they are not registered with the practice.

Further information:

- [Register with a Doctor](#)
- [Ridgmount Practice website](#)

### ***Out-of-hours support and information helpline***

UCL works in partnership with Care First to provide an out-of-hours support and information helpline. The helpline is free of charge and includes access to information specialists who are trained by Citizens Advice and to professionally-qualified and BACP-accredited counsellors who can help students with a range of emotional and psychological difficulties.

Further information:

- [Care First](#)

### ***Crisis support - immediate help***

If a student is in crisis there are a range of UCL and external sources of help such as Nightline, Ridgmount Medical Practice, Hall Wardens, Student Psychological Services and the Samaritans.

Further information:

- [Crisis Support](#)

## **Equality and diversity**

UCL fosters a positive cultural climate where all staff and students can flourish, where no-one will feel compelled to conceal or play down elements of their identity for fear of stigma. UCL is a place where people can be authentic and their unique perspective, experiences and skills seen as a valuable asset to the institution. The Equalities and Diversity website brings together a range of information on issues relating to race, gender, religion and belief, sexual orientation, and disability amongst other equalities initiatives at UCL.

## ***Departmental Equal Opportunity Liaison Officers***

Departmental Equal Opportunity Liaison Officers (DEOLOs) provide support and assistance for students and staff about issues relating to equalities and diversity. The DEOLO for the Department of Statistical Science is **Ms K Leport** (room 120, [k.leport@ucl.ac.uk](mailto:k.leport@ucl.ac.uk)).

Further information:

- [Equalities and Diversity](#)
- [Support for Pregnant Students](#)
- [Support for Students who are Parents](#)
- [Religion and Belief Equality Policy for Students](#)
- [UCL LGBT Student Support Pages](#)
- [UCL Chaplain and Inter-Faith Adviser](#)
- [DEOLOs \(Departmental Equal Opportunity Liaison Officers\)](#)

## **UCL's zero tolerance policy on harassment and bullying**

### ***Harassment and bullying***

Every student and member of staff has a right to work and study in a harmonious environment. UCL will not tolerate harassment or bullying of one member of its community by another or others and promotes an environment in which harassment and bullying are known to be unacceptable and where individuals have the confidence to raise concerns in the knowledge that they will be dealt with appropriately and fairly.

Further information:

- [UCL Policy on Harassment and Bullying](#)
- [Students' Union Advice Service](#)

### ***Sexual misconduct***

It is unacceptable for any person at UCL, whether staff or student, to be subjected to any unwanted and persistent behaviour of a sexual nature. UCL is working with the Students Union to implement a two-year action plan to tackle issues of sexual harassment and make sure that staff and students have access to relevant training. Any UCL student experiencing sexual harassment may access confidential support from a range of sources including their personal tutor or any other member of staff in their department or faculty who they trust, their Hall Warden, a Students' Union student officer, the trained staff at the [Students' Union Advice Service](#), or the [UCL Student Mediator](#).

Further information:

- [Zero Tolerance to Sexual Harassment](#)

### ***Support for students who have been affected by sexual violation***

UCL will do its utmost to support anyone who has been, or is being, affected by sexual violence. If a student would like to talk to somebody at UCL, the Student Support and Wellbeing Team can offer advice on the support available both internally and externally.

Further information:

- [Support for Students Who Have Been Affected by Sexual Violence](#)



# STUDENT REPRESENTATION

## Students' Union UCL

The Union helps you to do more at UCL, experience something you've always dreamt of, turn a curiosity into a new passion and help you reach your potential. The Union cares about the things you care about, it's made up of all kinds of people from all kinds of places and it's there to fight for you when you need someone in your corner.

Students' Union UCL is the representative body of all UCL students. It's run by students for students and is a registered charity, independent of UCL. All UCL students at every level are automatically members of the Union (but can opt out), and the Union's leaders are elected annually by and from all current students. The elected leaders are called Sabbatical Officers and they represent students on various UCL committees and campaign on the issues that matter to students. Alongside the Sabbatical Officers are more than 1000 voluntary representatives, elected or appointed to cover every part of UCL life.

Further information:

- [Students' Union website](#)
- [Membership information](#) (including how to opt out)
- [Elections information](#) (including how to run for office)

## Student societies

UCL students currently run over 250 different clubs and societies through the Students' Union, providing a wide range of extra-curricular activities for students to get involved with during their time at UCL.

Further information:

- [Students' Union Clubs & Societies](#)

## Academic Representatives

Your Students' Union is there to make sure you have the best possible time while they're studying at UCL. One of the ways they do that is by working with departments and faculties to ensure that every student is represented and has a voice in the way that the university works.

Every student at UCL will have a Course Representative or a Research Student Representative who will be your eyes, ears, and voice. They'll work closely with staff in your department to make sure that they understand what you most value, and take action to deal with things you'd like to see improve. They'll also work with representatives in your faculty and the Students' Union to make things better across the whole of UCL.

These Academic Representatives are appointed during early October – if you'd like to take up the role, staff in your department can tell you how. If you take up a representative role, the Students' Union will work closely with you to provide training, support, and advice, and you'll be able to change the experience of everyone on your course or in your department for the better.

Even if you don't fancy taking up a role yourself, keep an eye out for your chance to vote for which students you feel will do the best job.



Further information:

- [Academic Representation website](#)
- [Find your Representative](#)
- [Become an Academic Representative](#)

## **Staff-Student Consultative Committee**

Every department at UCL has a Staff-Student Consultative Committee (SSCC) that meets at least three times a year. The SSCC is a forum for discussion between staff and student academic representatives. It's a great chance to work closely with staff to improve students' learning experience, and a big part of how together we make education better at UCL.

It is possible in principle for every interested student to attend the committee meetings (subject to space restrictions). The minutes of previous meetings are available on the DOSSH Moodle page for students to consult.

## **Departmental Teaching Committee**

This committee oversees the organisation and structure of the degree programmes and courses offered by the Department. It also considers teaching matters arising from meetings of the Staff-Student Consultative Committee. Student representatives (including at least one from each undergraduate year group) are invited to Departmental Teaching Committee meetings.

## **The Advice Service**

The Students' Union Advice Service is available to UCL students. Trained and experienced caseworkers are ready to support you with any difficulties that might occur during your time at UCL. The Advice Service specialises in:

- **Academic issues** - including examination irregularities and student complaints
- **Housing** - including contract checking and housemate disputes
- **Employment** - including unpaid wages and part time employment contracts
- **Money advice** - including advice on benefits
- Many other legal and university matters

Sessions are confidential and will not be reported to your department or any other university staff unless at your request. Students can make an appointment or attend a drop-in session for free, confidential and independent advice and support.

Further information:

- [Students' Union Advice Service website](#)

## **Student complaints**

UCL aims to ensure that every student is satisfied with their experience of UCL. However we recognise that from time to time problems do arise and students may wish to express concern or dissatisfaction with aspects of UCL or the quality of services provided.

### ***Informal resolution***

Many complaints can be resolved at an informal or local level without needing to submit a formal complaint. Students can speak to their Personal Tutor, Programme Leader, Departmental or Faculty Tutor, Course Representative or Research Student Representative if they have any concerns about their programme. They can also speak to the UCL Student Mediator or the Students' Union's Advice Service. UCL strongly encourages this kind of

resolution and does expect students to have attempted some form of informal resolution before making a formal complaint.

### **Formal complaints**

If an issue cannot be resolved at a local level, students may feel they need to submit a formal complaint using UCL's Student Complaints Procedure. UCL aims to ensure that all complaints are treated fairly, impartially, effectively and in a timely manner, without fear of victimisation. The Complaints Procedure applies across all Schools, Faculties, Academic Departments and Professional Service Divisions.

Further information:

- [Student Complaints Procedure](#)
- [UCL Student Mediator](#)

## **STUDENT FEEDBACK**

UCL's goal is to put students' feedback, insights and contributions at the heart of our decision-making. We value students' feedback and work with students as partners in the process of shaping education at UCL. In recent years, as a direct result of student feedback, we extended library opening hours, opened new study spaces and scrapped graduation ticket fees for students.

The Department is very interested in how students feel about studying Statistics at UCL and how well we are doing according to the students' point of view. There are a number of ways in which students can give feedback to the Department, some of which are detailed below. Students are also encouraged to give individual feedback to their Personal Tutor (regarding general issues) and to the course lecturers (regarding specific courses). The Department will try its best to take students' opinions into account wherever possible.

### **Student surveys**

One of the principal ways in which UCL gathers and responds to student feedback is via online student experience surveys such as the National Student Survey, The Postgraduate Taught Experience Survey and the new to UCL survey. Whether it's about teaching, accommodation, or facilities, surveys are a chance for students to have their say about what works and what needs improving, to help us make sure that UCL is as good as it can be for current and future students. We aim to minimize the volume of surveys students are asked to take, so undergraduates will be invited to take just one institutional survey per year, and full-time postgraduate students will be invited to take two. Each survey usually takes just a few minutes to complete, all responses are anonymous and some include a generous prize draw. Every piece of feedback is read and the results of each survey are then shared with staff right across UCL – including President & Provost Michael Arthur.

Further information:

- [UCL Student Surveys](#)

### **Student evaluation questionnaires (SEQ)**

Departments also run student evaluation questionnaires on individual modules throughout the year. This gives students the opportunity to feedback about the teaching on their specific modules, helping departments to continuously improve learning, teaching and assessment. Feedback from SEQs feeds into the Annual Student Experience Review process.

The Department relies on feedback from as many students as possible in order to get a clear picture of how well the courses are running and whether improvements can be made. You will be asked to complete a questionnaire for each course that you take. This is usually done during the last two weeks of a course. You are expected to take this exercise seriously. Anonymity is preserved and space is provided on the questionnaires for additional comments if you feel that is required (positive comments are also helpful; frivolous comments will be discounted).

## **The Annual Student Experience Review (ASER)**

UCL's Annual Student Experience Review (ASER) process requires all departments to undertake an annual self-evaluation and produce a development plan for how they plan to improve in the coming year. The self-evaluation involves looking at student feedback from surveys and student evaluation questionnaires as well as other data about student performance and academic standards, such as the feedback provided by the External Examiner, which helps departments to understand what is working well and what might need improving. Student Academic Representatives are active participants in the evaluation process and creation of the development plan through discussions at departmental and faculty committees, giving students an important role in identifying and planning improvements within their department. Students can view the completed reports and action plans on the faculty/departmental intranet.

Further information:

- [Annual Student Experience Review](#)

## **UCL ChangeMakers**

UCL ChangeMakers supports students and staff to work in partnership to enhance the student learning experience across UCL. UCL ChangeMakers Projects supports students and staff in running projects to improve the learning experience at UCL. Anyone with an idea can submit a proposal for funding and support. UCL ChangeMakers ASER facilitators are students who work with Student Academic Representatives and staff in selected departments to formulate the departmental educational enhancement action plan. UCL ChangeMakers Student reviewers work with staff to review their teaching practice.

Further information:

- [UCL ChangeMakers](#)

# **EMPLOYABILITY AND CAREERS**

## **Careers information**

Within the Department, there is a careers noticeboard in the Students' Common Room. Job advertisements and information about careers talks, fairs and courses are posted there. There are special careers talks arranged by the Careers Tutor for students from each year, including first years.

You may approach members of the academic and teaching staff for a job reference. However, please note that staff cannot supply a reference without your written permission (see page 9). If you require a reference, therefore, you should fill in a form, available from the

Departmental Office and the DOSSSH Moodle page (see page [DOSSSH](#)). This form also contains space for you to provide other relevant information (for example, a description of the position / course you are applying for, and a brief CV). This kind of information will enable staff to write constructive references for you.

## **UCL Careers**

UCL Careers provides a wide variety of careers information, one-to-one guidance and events for UCL students and recent graduates, and assists them through the entire job hunting process, including exploring options, searching for vacancies, preparing CVs and applications, practicing for interviews, aptitude tests or assessment centres, and providing access to recruitment fairs and other employment-related events. They can also advise on exploring options for further study and funding. These specialised services and events are available to graduates, international students and Master's students for up to two years following course completion.

UCL Careers also supports work-related learning, including internships and placements. UCL students who are required to complete a placement or internship as part of certain courses are supported in their search, application, and work by UCL Careers. Students can also sign up for UCL Talent Bank, a shortlisting service connecting students to small and medium sized organisations.

Further information:

- [UCL Careers](#)

## **Entrepreneurship at UCL**

UCL has a long and successful track record of supporting spin-outs and start-ups developed by its academic and student communities. Many of the student and staff entrepreneurs have won external awards and achieved substantial investment allowing their enterprises to grow and reach their full potential. UCL offers a wide range of support to students ranging from training programmes, advice on whether an idea has commercial potential, one-to-one sessions with business advisers, funding, competitions and incubator space to help them start or grow their business.

Further information:

- [UCL Enterprise](#)

## **UCL Global Citizenship Programme**

The UCL Global Citizenship Programme is aimed at UCL undergraduates and taught postgraduates offering them the chance to put their studies in a global context, connect with students across UCL and see the world differently. The Programme runs for two weeks after summer exams have finished, providing a range of opportunities to help students boost their studies, develop hands-on skills and make an impact on the world. Participation is free and is not assessed. Places are awarded on a first come, first served basis.

Further information:

- [UCL Global Citizenship Programme](#)

# HEALTH, SAFETY AND SECURITY

## Health, safety and security at UCL

UCL's overall objective is to provide and maintain a safe and healthy environment for staff, students, people who work with UCL and those who visit. Health and safety is an integral part of the way in which UCL's activities are managed and conducted. The UCL Safety Services webpage includes further information about health and safety policies and useful guidance and tools for risk assessment. The UCL Security Services webpage includes information regarding security operations, emergency contacts and tips for staying safe at UCL.

Further information:

- [UCL Health and Safety Policy](#)
- [UCL A-Z Safety Guidance](#)
- [General Fire Safety for UCL Students](#)
- [UCL Security Services](#)
- [Staying Safe at UCL](#)

## AFTER STUDY

### Transcripts

An official transcript, detailing examinations taken and results achieved, is issued automatically to all graduating students and sent to their contact addresses as held on Portico approximately 8-10 weeks after the awards have been ratified by the UCL authorities.

UCL Student Records can produce additional transcripts for students on taught programmes as well as for affiliate students via the [UCL Transcript Shop](#).

Further information:

- [Transcripts](#)

### UCL Alumni Online Community

The UCL Alumni Online Community is a global network of more than 200,000 former students of UCL. Alumni can take advantage of a wide range of benefits, services and discounts – on campus, across the UK and globally – including the Alumni Card, access to thousands of e-journals and library services and a free UCL-branded email service. The UCL Alumni Online Community also posts information about events and reunions happening around the world and other ways to get involved, including the UCL Connect professional development series.

Further information:

- [UCL Alumni](#)

## COURSE INFORMATION

The following pages give more detail, including outline syllabuses, of the core and optional courses comprising the MSc Data Science, MSc Statistics and MSc Statistics (Medical Statistics) programmes. For most courses, some indication is also given of areas where the course material may be applied in practice; this is to help students decide which options might be most suitable for them.

---

**STAT0028****(Regression Modelling) STATISTICAL MODELS AND DATA ANALYSIS**

**Aims of course:** To introduce the theory of linear and generalised linear / additive models and associated data analysis.

**Objectives of course:** On successful completion of the course, a student should have an understanding of the exponential family of distributions and their use in the formulation of generalised linear / additive models, and should be able to interpret the results of fitting such models in both a technical and non-technical manner.

**Applications:** The statistical methods introduced in STATG001 are very general, and they are used in almost all areas in which statistics is applied. In the course, we will analyse data sets from, among other areas, industrial quality control, astronomy, social sciences, and biology.

**Prerequisites:** STATG000. Simultaneous or previous attendance of STATG012, or its equivalent.

**Course content:** Multiple Linear Regression: inference techniques for the General Linear Model, applications, variable selection. Generalised Linear Models: structure incorporating an introduction to the exponential family of distributions, inference procedures. Categorical data: special cases of generalised linear models leading to logistic regression and log-linear models, use in data analysis. Introduction to non-linear modelling, mixed modelling, generalised estimating equations. Introduction to Generalised Additive Models: penalised regression splines and penalised estimation.  
*Course STATG003 gives students the computing skills to implement the methodology discussed in this course.*

**Texts:**

A.J. Dobson: *An Introduction to Generalised Linear Models* (2<sup>nd</sup> edition). Chapman and Hall, 2002.

W.J. Krzanowski: *An Introduction to Statistical Modelling*. Arnold, 1998.

T. Hastie, R. Tibshirani & J. Friedman: *The Elements of Statistical Learning*. Springer, 2001.

P. McCullagh & J.A. Nelder: *Generalized Linear Models* (2<sup>nd</sup> edition). Chapman and Hall, 1989.

F. E. Harrell: *Regression Modeling Strategies*. Springer, 2001.

D. Ruppert, M. P. Wand & R. J. Carroll: *Semiparametric Regression*. Cambridge Series in Statistical and Probabilistic Mathematics, 2003.

**Assessment for examination grading:**

- In-course assessment (see page 27)
- 2 hour written examination

The final mark is a 9 to 1 weighted average of the written examination and in-course assessment marks.

**Other set work:**

Exercises will be set during the course, which will not count towards the examination grading.

**Timetabled workload:**

Lectures: 2 hours per week.

Tutorials: 1 hour per week.

Office hours, during which the lecturer will be available to discuss students' individual problems with the course, will also be provided.

---

**STAT0029****(Survey Fundamentals) STATISTICAL DESIGN OF INVESTIGATIONS**

**Aims of course:** To provide an introduction to the statistical aspects relating to the design of experimental and observational studies, and to introduce associated methods of statistical analysis.

**Objectives of course:** On completion of the course, a student should have an understanding of the basic ideas of experimental design and observational studies; should be able to analyse data from a variety of experimental designs by the analysis of variance; should be able to assess the appropriateness of various sampling schemes and perform appropriate analyses.

**Applications:** this course addresses the issues of what data are needed to answer a particular substantive question, and conversely what questions can reasonably be answered using data that may be available. These issues are fundamental to quantitative analyses in all application areas.

**Prerequisites:** STATG000, or simultaneous or previous attendance of STATG006.

**Course content:** Principles of experimental design; planning of experiments; comparative experiments; common designs: completely randomised, randomised blocks, Latin square; factorial experiments; nested and split-plot; fixed and random effects; associated analyses - analysis of variance. Observational studies v. experiments: problems of bias, confounding, difficulty of causal interpretation; planning observational studies; analysis: matching, adjusting for confounding variables; cohort studies; case-control studies. Sampling: target and sampled populations, finite populations, simple random sampling, stratification and cluster sampling, ratio and regression estimators, randomised response methods; introduction to questionnaire design.

**Texts:**

D.C. Montgomery: *Design and Analysis of Experiments* (5<sup>th</sup> edition). Wiley, 2000.

W.G. Cochran: *Planning and Analysis of Observational Studies*. Wiley, 1983.

V. Barnett: *Sample survey principles and methods* (2<sup>nd</sup> edition). Arnold, 1991.

**Assessment for examination grading:**

- Two pieces of extended coursework, one of which involves working in pairs to design, carry out and report the results of an experiment

There is no written examination. The final mark is an average of the two coursework marks (equally weighted). Students failing to submit either assessment will be declared non-complete for the course.

**Other set work:**

Exercises will be set during the course which will not count towards the examination grading.

**Timetabled workload:**

Lectures and workshops: 2 hours per week.

Tutorials: 1 hour per week.

Office hours, during which the lecturer will be available to discuss students' individual problems with the course, will also be provided.

---

**STAT0031**

**(Bayesian (probabilistic methods) APPLIED BAYESIAN METHODS**

**Aims of course:** To introduce the Bayesian approach to statistical inference, to develop relevant theory, methodology and computational techniques for its implementation and to develop basic skills in use of the WinBUGS software for Bayesian modelling.

**Objectives of course:** On successful completion of this course, a student should be able to give an account of the underlying principles of Bayesian inference, and contrast these with those of other schools of inference; manipulate probability formulae to derive posterior and predictive distributions; perform conjugate prior-to-posterior analysis for simple Binomial, Poisson and Normal models; analyse these and more complex Normal models, using priors representing great prior uncertainty; use hierarchical and graphical modelling to represent and analyse complex systems; describe and implement Gibbs sampling methods for estimating posterior quantities; and use WinBUGS software to estimate complex Bayesian models.

**Applications:** Bayesian methods are currently gaining increasing popularity, largely because advances in computing facilities and in modern simulation-based Markov Chain Monte Carlo (MCMC) methods provide a means of analysing the complex data structures that arise in application areas as diverse as artificial intelligence, biology, genetics and environmental science. This course focuses on fundamental concepts and techniques, and introduces the computational tools needed to apply Bayesian methods in challenging research-level problems.

**Prerequisites:** STATG000 or STATG006.

**Course content:** Introduction to Bayesian statistics. Bayesian inference. Prior distributions. Graphical models. Hierarchical models. Markov chain Monte Carlo (MCMC: Gibbs sampling). WinBUGS software.

**Texts:**

P.M. Lee: *Bayesian Statistics: An Introduction* (3<sup>rd</sup> edition), chapters 1-3. Arnold, 2004.

J. Whittaker: *Graphical Models in Applied Multivariate Statistics*, chapters 1-3. John Wiley & Sons, 1990.

C.M. Bishop: *Pattern Recognition and Machine Learning*, chapter 8. Springer, 2006.

A. Gelman, J.B. Carlin, H.S. Stern & D.B. Rubin: *Bayesian Data Analysis* (2<sup>nd</sup> edition), chapter 5. Chapman and Hall / CRC, 2003.

W.R. Gilks, S. Richardson & D.J. Spiegelhalter (eds): *Markov Chain Monte Carlo in Practice*, chapters 1, 2 and 5. Chapman & Hall/CRC, 1996.

**Assessment for examination grading:**

- In-course assessment (see page 27)
- 2 hour written examination

The final mark is a 9 to 1 weighted average of the written examination and in-course assessment marks.

**Other set work:**

About 5 sets of exercises. These will not count towards the examination grading.

**Timetabled workload:**

Lectures: 2 hours per week. Some of these may be devoted to workshops or coursework feedback.

Tutorials: 2 hours per fortnight.

Office hours, during which the lecturer will be available to discuss students' individual problems with the course, will also be provided.

---

**STAT0032  
(Data Science  
Foundations) INTRODUCTION TO  
STATISTICAL DATA SCIENCE**

**Aims of course:** To provide a general background on fundamental statistical methods and applications in data science.

**Objectives of course:** On successful completion of the course, students should have an understanding of the fundamental aspects of probability and statistics sufficient to follow other Masters level modules in Statistical Science. Students should also be equipped to lead basic data analysis projects in industry and research. The module will teach students: how to use probability as a language to express uncertainty; ways of visualizing and preparing data for statistical analysis; estimation techniques in the context of applied data analysis problems; the role of algorithms in the computation of estimators; how to express uncertainty in estimation via confidence intervals and hypothesis testing; predictive analysis from the point of view of regression.

**Applications:** The statistical methods introduced in STATG006 are very general, and they are used in almost all areas in which

statistics is applied. In the course, we will discuss applications in the context of business, social sciences, and biology, among others.

**Prerequisites:** Knowledge of introductory probability and statistical theory, and the associated necessary mathematical theory.

**Course content:** Exploratory data analysis: basic visualisation for data preparation and modelling strategy. Review of probability models, in the context of the different statistical methods discussed in the course. Hypothesis testing and confidence intervals: methods for assessing the uncertainty in the analysis. Regression: linear and non-linear methods for explaining outcomes. Point estimation, maximum likelihood and basic optimization: fitting generic statistical models. Dimensionality reduction: explaining the variability in datasets using fewer dimensions.

**Texts:**

J.A. Rice: *Mathematical Statistics and Data Analysis (3<sup>rd</sup> edition)*. Duxbury Press, 2006.

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

L. Wasserman: *All of Statistics: a Concise Course in Statistical Inference*. Springer, 2004.

A. Gelman & J. Hill: *Data Analysis using Regression and Multilevel/Hierarchical Models*. Cambridge University Press, 2007.

**Assessment for examination grading:**

- In-course assessment (see page 27)
- 2 hour written examination

The final mark is a 9 to 1 weighted average of the written examination and in-course assessment marks.

**Other set work:**

Exercises will be set during the course, which will not count towards the examination grading.

**Timetabled workload:**

Lectures: 2 hours per week.

Tutorials: 1 hour per week.

Office hours, during which the lecturer will be available to discuss students' individual problems with the course, will also be provided.

---

**STAT0010  
(Time Series Analysis) FORECASTING**



**Aims of course:** To introduce methods of finding and extrapolating patterns in time-ordered data.

**Objectives of course:** On successful completion of the course, a student should be familiar with the most commonly-used models for time series; be able to derive properties of time series models; be able to select, fit, check and use appropriate models for time-ordered data sequences; understand and be able to interpret the output from the time series module of a variety of standard software packages.

**Applications:** Time series data take the form of observations of one or more processes over time, where the structure of the temporal dependence between observations is the object of interest. Such data arise in many application areas including economics, engineering and the natural and social sciences. The use of historical information to estimate characteristics of observed processes, and to construct forecasts together with assessments of the associated uncertainty, is widespread in these application areas.

**Prerequisites:** STATG000 or STATG006.

**Course content:** Forecasting as the discovery and extrapolation of patterns in time ordered data. Descriptive techniques for time series. Box-Jenkins models: identification, estimation, verification. Forecasting using ARIMA and structural models. Forecast assessment. State space models and Kalman Filter. Comparison of procedures. Practical aspects of forecasting. Case studies in forecasting.

**Texts:**

C. Chatfield: *The Analysis of Time Series: An Introduction* (5<sup>th</sup> edition). Chapman and Hall, 1996.

J.D. Cryer: *Time Series Analysis*. PWS Publishers, 1986.

A.C. Harvey: *Time Series Models* (2<sup>nd</sup> edition). Harvester Wheatsheaf, 1993.

**Assessment for examination grading:**

- In-course assessment (see page 27)
- 2 hour written examination

The final mark is a 4 to 1 weighted average of the written examination and in-course assessment marks.

**Other set work:**

About 7 sets of exercises. These will not count towards the examination grading.

**Timetabled workload:**

Lectures: 2 hours per week.

Workshops: two 2 hour classes.

Office hours, during which the lecturer will be available to discuss students' individual problems with the course, will also be provided.

---

**STAT0008**

**(Further Survey Estimation Methods)  
STATISTICAL INFERENCE**

**Aims of course:** To provide a grounding in the theoretical foundations of statistical inference and, in particular, to introduce the theory underlying statistical estimation and hypothesis testing.

**Objectives of course:** On successful completion of the course, a student should be able to: describe the principal features of, and differences between, frequentist, likelihood and Bayesian inference; define and derive the likelihood function based on data from a parametric statistical model, and describe its role in various forms of inference; define a sufficient statistic; describe, calculate and apply methods of identifying a sufficient statistic; define, derive and apply frequentist criteria for evaluating and comparing estimators; describe, derive and apply lower bounds for the variance of an unbiased estimator; define and derive the maximum likelihood estimate, and the observed and expected information; describe, derive and apply the asymptotic distributions of the maximum likelihood estimator and related quantities; conduct Bayesian analyses of simple problems using conjugate prior distributions, and asymptotic Bayesian analyses of more general problems; define, derive and apply the error probabilities of a test between two simple hypotheses; define and conduct a likelihood ratio test; state and apply the Neyman-Pearson lemma;

**Applications:** The theory of statistical inference underpins statistical design, estimation and hypothesis testing. As such it has fundamental applications to all fields in which statistical investigations are planned or data are analysed. Important areas include engineering, physical sciences and industry, medicine and biology, economics and finance, psychology and the social sciences.

**Prerequisites:** STATG000.

**Course content:** Frequentist and Bayesian approaches to statistical inference. Summary statistics, sampling distributions. Sufficiency, likelihood, and information. Asymptotic properties of estimators. Bayesian inference. Hypothesis testing. Likelihood ratio tests, application to linear models.

**Texts:**

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

P.H. Garthwaite, I.T. Jolliffe & B. Jones: *Statistical Inference* (2<sup>nd</sup> edition). Oxford University Press, 2002.

P.M. Lee: *Bayesian Statistics: An Introduction* (2<sup>nd</sup> edition). Arnold, 1997.

J.A. Rice: *Mathematical Statistics and Data Analysis* (3<sup>rd</sup> edition). Duxbury, 2006.

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

**Assessment for examination grading:**

- In-course assessment (see page 27)
- 2 hour written examination

The final mark is a 9 to 1 weighted average of the written examination and in-course assessment marks.

**Other set work:**

About 8 sets of exercises. These will not count towards the examination grading.

**Timetabled workload:**

Lectures: 2 hours per week.

Workshops: 2 two-hour classes.

Tutorials: 1 hour per week.

Office hours, during which the lecturer will be available to discuss students' individual problems with the course, will also be provided.

---

**STAT0017**

**(Advanced Statistical Modelling) SELECTED TOPICS IN STATISTICS**

**Aims of course:** To provide an introduction to, and practical experience of, key ideas in selected specialized topics that are at the forefront of developments in modern statistical research and practice. The module is aimed specifically at students who may be considering going on to do research in statistics or related areas.

**Objectives of course:** On successful completion of the module, students should be able to: explain the motivation for, and key ideas involved, in the topics that have been studied; identify situations in which the studied techniques are potentially applicable, while recognizing their potential limitation; use software packages that are available in R to apply the techniques to real-world examples where appropriate; and understand the context of research papers in the areas that have been studied.

**Applications:** the availability of huge and often complex data sets, coupled with cheap computing power makes it possible to contemplate analyses that were inconceivable even two decades ago. The development of statistical methodology has made full use of these opportunities, so that modern statistics has made significant contributions in a wide range of application areas. The material covered in this course will vary from year to year so that the specific applications will vary; however, it will provide students with some insight into the state of the art. As such it would be suitable for students contemplating research in statistics or, indeed, in any other subject where complex problems require the use of advanced statistical methods.

**Prerequisites:** STATG001 or both STATG006 and COMPGI21. STATG003.

**Course content:** This course will provide an introduction to two or three advanced topics in modern statistics. The precise topics covered will vary from year to year, depending on teaching staff availability and research interests. Examples of topics might include: bootstrap and related methods; extreme value theory; multivariate analysis; nonparametric smoothing; robust methods; spatial statistics; applied probability; and estimating functions. Where appropriate, the methods will be illustrated using software available in the R package.

**Topic 1: Cluster Analysis (Dr CM Hennig)**

Cluster analysis is about finding groups of observations in data. It has a very wide range of applications such as delimitation of species in biology, data compression, classification of diseases or mental illnesses, market segmentation, detection of patterns of unusual internet use, classification of regions or countries for administrative use, object identification in images etc. In the internet age, much data is routinely collected, and many such datasets are heterogeneous and

chaotic. Cluster analysis is often used as a first exploratory tool to find better manageable subgroups, or more generally, to find unexpected patterns in datasets.

In the course, three basic approaches of cluster analysis will be introduced, namely defining clusters by optimal centroid objects, statistical mixture models, and hierarchical distance-based methods. A general idea of clustering is that objects in a cluster should be similar to each other, and distant from objects in other clusters. The course will therefore introduce some measurements of similarity and distance that can be applied to various data types (e.g., data with continuous, categorical or mixed variables). Furthermore, the tricky issue of estimating or deciding the number of clusters will be treated, along with techniques to check the validity and to visualise clusterings.

Data examples will be given and it will be explained how to use R for running the introduced analyses. Knowledge of R (STATG003) and of basic statistical modelling as introduced in STATG001 or STATG006 is required. The following texts are relevant to this part of the course:

B.S. Everitt, S. Landau, M. Leese & D. Stahl: *Cluster Analysis* (5<sup>th</sup> edition). Wiley, 2011.  
L. Kaufman & P.J. Rousseeuw: *Finding Groups in Data - an Introduction to Cluster Analysis*. Wiley, 1990/2005.

## **Topic 2: Model validation, model selection and model comparison (Dr FJ Király)**

The recent “big data” revolution has seen a surge of interest in machine learning strategies such as neural networks (aka deep learning), kernel learning, or ensembling, contributing to an ever-growing method zoo to choose (or not to choose) from. This naturally leads to the question of what would be a sensible way to do so, and how to check whether the chosen modelling strategies are sensible. More precisely, how to quantitatively assess the performance of strategies on a given dataset of interest, and how to choose a method to deploy in a practical setting where one may have to trade-off interpretability against computational cost against accuracy – a deep neural network run on a large computational cluster may not always be preferable above simple linear regression (or above always predicting the number 42).

The course will introduce the basic concepts of model-external model assessment for

supervised classification and regression tasks, highlighting connections to meta-modelling and model tuning, while introducing the proper mathematical setting in which model-agnostic model appraisal and model selection can be studied, including the statistical guarantees which can (or cannot) be given (STATG001 or COMPGI21 level familiarity with predictive/supervised modelling strategies is required). Later parts of the course will give an overview on results, limitations and open research questions in validation of unsupervised methodology (e.g., clustering), probabilistic modelling (e.g., Bayesian), or time series related tasks (e.g., forecasting).

The course content will be illustrated by workshop content using the R or python languages (basic level working knowledge in one of the two will be required), accompanied by overviews of the most frequently employed method classes for the mentioned tasks, together with a hands-on guide on their use (and appropriateness) in general data analytics and model validation workflows in state-of-art machine learning environments. The following texts are relevant to this part of the course:

S. Arlot, A. Celisse: *A survey of cross-validation procedures for model selection*. *Statistics Surveys*, Vol. 4 (2010) 40–79.  
Y. Grandvalet, Y. Bengio: *Hypothesis testing for cross-validation*. Technical Report 1285, D’épartement d’Informatique et Recherche Op’eracionnelle, 2006.  
N. Japkowicz, M. Shah: *Evaluating learning algorithms – a classification perspective*. Cambridge University Press, 2011.  
A. Vehtari, J. Ojanen: *A survey of Bayesian predictive methods for model assessment, selection and comparison*. *Statistics Surveys*, Vol 6 (2012), 142-228.

### **Assessment for examination grading:**

- Two pieces of extended coursework (one for each topic)

There is no written examination. The final mark is an average of the two coursework marks (equally weighted). Students failing to submit either assessment will be declared non-complete for the course.

### **Other set work:**

Several sets of exercises. These will not count towards the examination grading.

### **Timetabled workload:**

Lectures: 2 hours per week.

Workshops: eight 2 hour classes.

Office hours, during which the lecturer will be available to discuss students' individual problems with the course, will also be provided.

---

## STAT0030 STATISTICAL COMPUTING

**Level:** 7 Credits: 15 Term: 1 & 2

**Aims:** To introduce the statistical package R with particular application to statistical modelling and a selection of computational techniques.

**Objectives:** On successful completion of the module, a student should be able to use the statistical package R to input, edit and manipulate data, produce appropriate graphics and implement statistical methods taught in modules STAT0028, STAT0029 and STAT0032. In addition, the student should be familiar with some basic principles of programming, and should be able to carry out simple programming in R with application to a variety of computational and numerical techniques.

**Applications:** the generic programming skills acquired in this module are applicable across a wide variety of scientific disciplines as well as in the IT sector. More specifically, the R programming environment is gaining popularity among many research communities as well as in specialised areas of business and industry, such as finance and reinsurance, where non-routine statistical analyses are increasingly required.

**Prerequisites:** Simultaneous or previous attendance of STAT0028 or STAT0032, together (in either case) with STAT0029 or IEHC0045.

**Content:** Using R: expressions, assignments, objects, vectors, arrays and matrices, lists and data frames, functions, control structures, graphics. Efficiency considerations. Statistical modelling in R (in collaboration with STAT0028 and STAT0029): linear and generalised linear modelling, analysis of variance, residual plots, non-linear modelling. Computational techniques: function minimisation (in particular for mle's and in non-linear modelling), quadrature, simulation (general methods, Monte Carlo). R versus SPlus.

---

**Texts:** B.S. Everitt: A Handbook of Statistical Analyses using S-Plus (2nd edition). Chapman and Hall, 2002. 62

### Assessment:

- Three pieces of extended coursework. There is no written examination. The final mark is a 1:2:2 weighted average of the three coursework marks.

### Timetabled workload:

About 10 two-hour workshops. Office hours, during which the lecturer will be available to discuss students' individual problems with the module, will also be provided.

---

## MSIN0143

### DISSERTATION – DATA ANALYTICS FOR GOVERNMENT

**Aims of course:** To enable students to apply statistical and computational tools, techniques and methodologies to real-world problems in the area of official/government statistics and to present their findings in a written report, and orally via an assessed presentation.

**Objectives of course:** On successful completion of the course, a student should be able to plan a suitable schedule for completing an extended project; obtain or access relevant background information and data; select and apply appropriate formal and informal statistical methods, using computer software as appropriate; assess what has been achieved and point to further research; use appropriate word processing skills to write up a project dissertation efficiently; and communicate findings both technically and non-technically, in a word processed dissertation and an oral presentation.

**Prerequisites:** Relevant material from other courses in the MSc programme.

### Assessment for examination grading:

*Dissertation* (normally between 10000-12000 words, i.e. about 30 pages, A4 size, double-spaced typing, excluding graphs, tables, computer programmes and other output), to be submitted by the start of September. Over-length reports will be penalised (see page 28). *Oral presentation* (15 minutes excluding questions) at the start of September. The final mark is a 4 to 1 weighted average of the dissertation and presentation marks.

### Timetabled workload

Skills development: Preparation for the project starts with several practical exercises, presented and discussed in workshop sessions during terms 1 and 2. Topics include preparing and presenting short talks, presenting information in tabular and graphical form, reading and digesting other people's research, and the use of the document preparing system LaTeX. Participation in these activities is mandatory although it does not count towards the assessment for the course: any student whose participation is inadequate will be declared non-complete for the course.

Tutorials: about once a week, starting in June.  
Individual study: full-time, starting in June.

---

## **STEP0020 (Statistics in Government) ANALYTIC METHODS FOR POLICY**

### **Overview**

The problems encountered within the spheres of public policy and public administration typically span diverse topical domains, involve the perspectives of multiple actors, and are situated within rapidly changing environments. The nature of these problems thereby demands a diverse and complex skill set from those working directly to engage with them. Policy analysts need to be able to not only understand the requirements of effective and efficient analysis of complex problems, but also know how such insight can be operationalised into practical process design, procurement, execution, quality assurance, and communication of such analytical processes—often attempting to deploy rigorous techniques in far from ideal situations and environments.

While policy challenges faced will be diverse in their context and specialist requirements, this course seeks to impart a systematic approach to underpin their analysis. It contends that there is a subset of analytic methods likely to be useful in resolving a wide range of policy issues. In practice, however, constrained by time, limited resources and other working pressures, analysts often default to selecting analytic methods on grounds of their familiarity rather than suitability to the task at hand. In addition, it is not uncommon for analysts to have been conditioned throughout their educational and professional personal histories to affiliate themselves with either quantitative or qualitative expertise. Such biases within analytical enquiry fundamentally regrettably put at risk the potential for further useful

analytical insights to contribute to the resolution of a policy issue. Rather than separately engage quantitative and qualitative techniques, analysis for policy instead requires multi- methodological practice that simultaneously combines their relative contributions.

This course introduces a diverse range of analytical methods for informing public decisions.

Over 20 different methods are presented to provide students with an overview of the landscape of analytic practice for policy. These cover analytic contributions across the spectrum of public problem-solving activities: defining the problem; understanding the system; exploring options; analysing risk; informing action; and communicating insight. Four principles guide the design of this course. First, policy problems are typically multifaceted and require multiple, not single analytical approaches. This course therefore seeks to equip its graduates with a literacy in range of analytical methods for policy. Second, there is emphasis on methods that can be used by policy analysts on day-to-day basis in informing public decisions, rather than research methods that might be used in long-term analysis of public policy development. Special attention is therefore paid throughout the course to pragmatic considerations and guidance in method selection and application. Third, analytical enquiry should be driven by the nature of the subject policy problem, and not vice versa. The teaching of methods will therefore be grounded in theory, and connections made to concepts and frameworks introduced elsewhere in the STEaPP Masters of Public Administration programme (MPA). Finally, this course argues that methods cannot be learned without applying them. It therefore uses an experiential and applied approach where students use analytic methods introduced on practice problems and real-world policy cases with STEaPP partners.

Aims of course:

1. Cover the diverse landscape of analytic methods used in policy practice.
2. Develop literacy across a wide range of analytic methods.
3. Develop competency in a subset of quantitative and qualitative methods.
4. Equip students to be 'intelligent customers' when using external analytic Products.
5. Provide pragmatic guidance on how to undertake insightful analysis in constrained environments

6. Provide social and computational skills and signposts to resources that can be used to further develop analytic competencies.

Learning Outcomes:

On successful completion of this course, students will be able to:

- Design an analytic process to inform complex policy decisions.
- Use a range of qualitative and quantitative techniques to collect and process data for policy development.
- Elicit intelligence about the individual and shared expectations that shape policy decisions.
- Generate evidence that explains the behaviour of a policy system.
- Generate alternative options for policy action.
- Determine possible implications of different decisions.
- Assemble multiple analytical contributions into a decision rationale.
- Use visualisation to communicate complex analysis for policy decisions effectively and efficiently.
- Use the general-purpose programming language R to achieve both analysis laid out in the course, as well as learn/utilise other methods as required in future.
- Judge the suitability and quality of analytic methods used for policy analysis.

---

**MSING055  
(Statistical Programming) PROGRAMMING  
FOR BUSINESS ANALYTICS**

**Aims of course:**

Computational models and concepts for business analytics need to be implemented with tools and technologies.

Students will learn about computational thinking, experimental methodology and empirical methods for training, validation and testing models. This course will cover the preparation of datasets, and introduce students to simple examples of both supervised and unsupervised methods. The importance of plotting and visualisation for decision support will be emphasised. Lab sessions will begin with a general introduction to programming in Python using Jupyter Notebooks. We will introduce programming for students and the content will be covered sufficiently fast that we can reach a point where you will be able to apply this knowledge to your research at the end of the course, and

we will not try to hide away the niggling details that you will encounter in real programming. There will also be an opportunity for students to familiarise themselves with other data analytics software packages including Matlab, RStudio and Stata and Tableau.

Learning outcomes:

- Upon successful completion of the module, students will be able to:
- Understand computational thinking
- Be able to explore data and programme simple algorithms
- Evaluate computational approaches to data analytics problems
- Visualise data for business analytics
- Assess performance of algorithms

Topics covered:

- Data types and structures
- Data preparation and exploratory data analysis
- Experimental methods
- Introduction to methods for large data sets
- Implementation of supervised learning algorithms
- Plotting, visualisation and decision support
- Implementation of unsupervised learning algorithms
- Performance, evaluation and overfitting
- Simple complexity and runtime analysis

Essential reading:

- Data Science for Business: What you Need to Know about Data Mining and Data Analytic
- Thinking, T. Fawcett and F. Provost, O'Reilly, 201

---

**SOCS0054  
(Introduction to Survey Research) SURVEY  
DESIGN**

This module is an introduction to survey methods. It aims to familiarise students with key principles of survey design and sampling, questionnaire design and evaluation, data collection modes, non-response and dealing with missing data, ethical issues in survey research and using data for secondary analysis. Each session will be mirrored by a practical workshop seminar where students will put the learning introduced in the lectures to use through real-world practical examples. By the end of the module, students should be able to critically evaluate the quality of survey data which they want to conduct secondary

analysis of and to understand the key design issues in implementing a survey of their own.

---

**SOCS0056  
(Survey Data Collection) INTRODUCTION  
TO LONGITUDINAL DATA AND ANALYSIS**

The module will build on learning in introduction to regression analysis in Term 1 and introduces students to longitudinal data analysis. They will learn about age/cohort/period effects, covariation and causation, stability and change. As part of this module students will be introduced to longitudinal datasets and get a chance to use these data themselves using Stata software, expanding their software skills already learned in Term 1. Students learn about measurement issues in longitudinal research and techniques for dealing with them. Students will then be introduced to more advanced techniques for analysing longitudinal data such as transition modelling, Structural Equation Modelling and latent growth analysis.

---

**CASA0003  
DIGITAL VISUALISATION**

The module introduces the students to methods of visualisation and data mining within the geospatial domain. Developed as a group project the module aims to provide an understanding of the juxtaposition between research, data capture and data display methodologies.

Forecasting using ARIMA and structural models. Forecast assessment. State space models and Kalman Filter. Comparison of procedures. Practical aspects of forecasting. Case studies in forecasting.

---

**CASA0005  
(Spatial Analysis) GIS MAPPING AND  
SPATIAL STATISTICS**

**Aims of the course:**

Geographic Systems and Science aims to equip students with an understanding of the principles underlying the conception, representation/measurement and analysis of spatial phenomena. It presents an overview of the core organising concepts and techniques of Geographic Information Systems, and the

software and analysis systems that are integral to their effective deployment in advanced spatial analysis.

**Learning outcomes:**

The practical sessions in the course will introduce students to both traditional and emerging technologies in geographical information science through the use of desktop GIS software like Arc GIS and Quantum GIS, and the powerful statistical software environment, R.

In developing technical expertise in these software tools, students will be introduced to realworld geographical analysis problems and, by the end of the course, will be able to identify, evaluate and process geographic data from a variety of different sources, analyse these data and present the results of the analysis using different cartographic techniques.

Description of Dissertation process (normally supervised by Prof S. Olhede, Dr T. Wang or Dr K. Sadgehi, but others may be available)

---

**INST0060  
FOUNDATIONS OF MACHINE LEARNING  
AND DATA SCIENCE**

**Aims of course:**

The module is intended as an introduction to machine learning and data science. The course focuses on the principles underlying probabilistic and statistical approaches, introducing a small number of explicit methodologies as exemplars, and looking at how these should be applied and evaluated by the careful practitioner.

**Prerequisites:** This module is designed to give you the mathematical intuition behind a number of core/common machine learning algorithms. There is a significant practical aspect too, in which you will learn to use the methods and evaluate their performance on real world data. However, the module is not purely about learning to use machine learning libraries. It is about learning how and why they work too. Incoming students are expected to have some background in mathematics (see the attached prerequisites document) and to have the rudiments of programming in Python. If you have never programmed in Python before, then you should have all you need by simply working your way through the following online tutorial: DataCamp { Intro to Python for Data Science 1 (it should take you about 4 hours)

**Intended Learning Outcomes:**

By the end of the course, students will have a basic understanding of supervised learning (regression and classification) and unsupervised learning (clustering and dimensionality reduction). They will be able to: apply methodologies in each of these problem domains; to assess the suitability of approaches to a constrained set of tasks; and employ common techniques to evaluate a methodology's performance.

**Content:** Students will study a selection of machine learning techniques, including theoretical underpinnings and potential applications. In the process, students will gain some mathematical insight about these (and related) approaches to probabilistic & statistical models, their strengths and weaknesses, and how to effectively evaluate their performance on data. A significant proportion of the course involves hands on experience of using and evaluating these techniques on real world data. A brief outline of the topics covered is as follows:

- Probabilistic & statistical foundations, such as: marginal, joint & conditional probabilities; Bayes theory; probability densities; maximum likelihood; expectation and variance.
- Regression methods, such as: least squares regression, regularization, and basis functions.
- Classification methods, such as: k-nearest neighbours & logistic regression.
- Clustering and dimensionality reduction such as: k-means, mixture of gaussians, and principle component analysis (PCA).
- Bayesian graphical models
- Evaluation techniques and concepts, such as: loss-functions; model selection and hypothesis testing.

**Delivery:**

Course will be delivered through lectures, tutorials, seminars and computing laboratory work. Where possible, there will be learning through practical work (e.g. programming), with an exposure to real world data. Potential tasks/data sets for exploring methods include: botanical sample descriptions for species classification; census data for predicting income levels; chemical constituents of food and drink; feature descriptions of images for clinical diagnosis; human activity recognition from smartphone data; and pre-processed text documents for clustering. As currently planned [June 6, 2017] the tutorial and lab work will involve programming in python. However, the decision on this is yet to be made. A short primer will be available for students unfamiliar with the chosen programming language.

**Prerequisites:**

There are no formal prerequisites required for this module in terms of other modules taken at UCL. However, the module assumes mathematical knowledge roughly equivalent to an A-level in the subject, including: some basic calculus (differentiation and integration); statistics; linear algebra and related concepts.

**Taught by:** Luke Dickens

---

The information given in this document is as far as possible accurate at the date of publication but the Department reserves the right to amend it.

Department of Statistical Science, UCL,  
September 2019.

**Notes**