UCL Master’s in Data Analytics for Government

Course Synopsis

UCL is excited to offer ONS a Master’s in Data Analytics for Government. Our course draws upon the deep technical and government-focused expertise of researchers and teaching fellows working across six UCL departments – a breadth which mirrors the multidisciplinary nature of data science, and its application to official statistics.

Aims of the programme:

- To impart deep understanding of, and practical experience in using 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 computational 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.

Programme Structure: Students pursue modules to the value of 180 credits. The programme consists of a foundation course (non-credit bearing), eight taught modules; (four compulsory, up to four selected options – totalling 120 credits), and a research dissertation (60 credits) Module titles are given below. As modules on this course have been taken from a range of existing modules which are almost all in operation across UCL already, the UCL module names are given first, with the corresponding ONS module name given in brackets.

Core modules:

Statistics Foundation Course – no credits, for refresher only
Analytic Methods for Policy (Statistics in Government) – 15 credits
Introduction to Statistical Data Science (Data Science Foundations) – 15 credits
Statistical Design of Investigations (Survey Fundamentals) – 15 credits
Programming for Business Analytics (Statistical Programming) – 15 credits
Data Analytics for Government Dissertation – 60 credits
Optional Modules* (students choose 120 credits from the below)
Survey Design (Introduction to Survey Research) – 15 credits
Statistical Models and Data Analysis (Regression Modelling) – 15 credits
Digital visualisation (Data visualisation) – 30 credits
Introduction to Longitudinal Data and Analysis (Survey Data Collection) – 15 credits
Statistical Inference (Further Survey Estimation Methods) – 15 credits
Selected Topics in Statistics (Advanced Statistical Modelling) – 15 credits
Forecasting (Time Series Analysis) – 15 credits
GIS Mapping and Spatial Stats (Spatial Analysis) – 15 credits
Applied Bayesian Methods (Bayesian (probabilistic methods) – 15 credits
Big Data (covers aspects of ‘An Intro to Machine Learning’ and ‘Data Mining’) – 15 credits
Numerical Methods – 15 credits
Techniques of High-Performance Computing – 15 credits
Research Software Engineering with Python – 15 credits
Research Computing with C++ – 15 credits

*due to capacity limitations, some optional courses may not run every year.

Modes of Study: It is anticipated that students will generally pursue the course flexibly over 3-5 years, and will structure their time during their chosen period of study so as to complete all the necessary modules and research dissertation. Guidance on appropriate durations of study can be sought from the course directors, in conjunction with ONS supervisors.

Delivery format, teaching and assessment: The majority of taught content will be delivered face-to-face in Bloomsbury, London. Some courses will have web-based components (e.g. Moodle pages, links to online resources), but most teaching will be in London. Some teaching is dedicated to practical (computer lab-based) work. Most modules will be assessed by unseen written exams, but certain modules will be assessed significantly or entirely by coursework and/or oral presentations.

Entry requirements: Applications are being accepted, in the first instance, from members of Staff from the Office for National Statistics. All applications must be made with the approval of the applicant’s line manager (or appropriate supervisor), and a letter of support must be included in the application pack.

Prospective students must also have a minimum of an upper second-class Bachelor’s degree in a quantitative discipline from a UK University, or an overseas qualification of an equivalent standard. Knowledge of mathematical methods and linear algebra at university level and familiarity with introductory probability and statistics is required. Applicants must demonstrate an interest in quantitative scientific investigation and problem solving, and in their application, should highlight their ideas and ambitions for implementing data science methodologies and tools in their civil service work.

Some modules may have specific, advanced mathematical or programming language requirements, which candidates will need to meet. Further guidance is available from the course directors.

Course directors:
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