Computational Statistics and Machine Learning
MSc

This MSc teaches advanced analytical and computational skills for success in a data rich world. Designed to be both mathematically rigorous and relevant, the programme covers fundamental aspects of machine learning and statistics, with potential options in information retrieval, bioinformatics, quantitative finance, artificial intelligence and machine vision.

Degree summary

The programme aims to provide graduates with the foundational principles and the practical experience needed by employers in the area of machine learning and statistics. Graduates of this programme will have had the opportunity to develop their skills by tackling problems related to industrial needs or to leading-edge research.

- The Centre for Computational Statistics and Machine Learning (CSML) is a major European Centre for machine learning having coordinated the PASCAL European Network of Excellence.
- Coupled with the internationally renowned Gatsby Computational Neuroscience and the Machine Learning Unit, and UCL Statistical Science, this MSc programme draws on world-class research and teaching talents. The centre has excellent links with world-leading companies in internet technology, finance and related information areas.
- The programme is designed to train students in both the practical and theoretical sides of machine learning. A significant grounding in computational statistics is also provided.

The programme is delivered through a combination of lectures, discussions, practical sessions and project work. Student performance is assessed through unseen written examinations, coursework, practical application and the project assessment process.

Degree structure

Mode: Full-time: 1 year
Location: London, Bloomsbury

Students undertake modules to the value of 180 credits. The programme consists of two core modules (30 credits), three to five optional modules (45 to 75 credits), one to three elective modules (15 to 45 credits) and a research project (60 credits). Please note that not all combinations of optional modules will be available due to timetabling restrictions.

Please note that the list of modules given here is indicative. This information is published a long time in advance of enrolment and module content and availability is subject to change.

COMPULSORY MODULES
- Supervised Learning (15 credits)
- Statistical Modelling and Data Analysis (15 credits)

OPTIONAL MODULES

Students must choose 45 to 75 credits from these optional modules. Students must take either Graphical Models or Probabilistic and Unsupervised Learning.

- Advanced Deep Learning and Reinforcement Learning (15 credits)
- Advanced Topics in Machine Learning (15 credits)
- Selected Topics in Statistics (15 credits)
- Applied Machine Learning (15 credits)
- Approximate Inference and Learning in Probabilistic Models (15 credits)
- Graphical Models (15 credits)
- Information Retrieval and Data Mining (15 credits)
- Introduction to Deep Learning (15 credits)
- Inverse Problems in Imaging (15 credits)
- Machine Vision (15 credits)
- Probabilistic and Unsupervised Learning (15 credits)
- Statistical Natural Language Processing (15 credits)

Please note: the availability and delivery of optional modules may vary, depending on your selection.

A list of acceptable elective modules is available on the Departmental page.

DISSERTATION/REPORT

- All MSc students undertake an independent research project, which culminates in a dissertation of 10,000-12,000 words.
Your career

There is a strong national and international demand for graduates with skills at the interface of traditional statistics and machine learning. Substantial sectors of UK industry, including leading, large companies already make extensive use of computational statistics and machine learning techniques in the course of their business activities. Globally there are a large number of very successful users of this technology, many located in the UK. Areas in which expertise in statistics and machine learning is in particular demand include: finance, banking, insurance, retail, e-commerce, pharmaceuticals, and computer security. Graduates have gone on to further study at, for example, the Universities of Cambridge, Helsinki, Chicago, as well as at UCL. The MSc is also ideal preparation for a PhD, in statistics, machine learning or a related area.

Employability

Scientific experiments and companies now routinely generate vast databases and machine learning and statistical methodologies are core to their analysis. There is a considerable shortfall in the number of qualified graduates in this area internationally. CSML graduates have been in high demand for PhD positions across the sciences. In London there are many companies looking to understand their customers better who have hired our CSML graduates. Similarly graduates now work in companies in, amongst others, Germany, Iceland, France and the US in large-scale data analysis. The finance sector has also hired several graduates recently.
Entry requirements

A minimum of an upper second-class UK Bachelor’s degree in a highly quantitative subject such as computer science, statistics, mathematics, electrical engineering or the physical sciences, or an overseas qualification of an equivalent standard. Relevant work experience may also be taken into account. Students must be comfortable with undergraduate-level mathematics; in particular it is essential that the candidate will have knowledge of statistics at an intermediate undergraduate level. The candidate should also be proficient in linear algebra and multivariable calculus.

English language proficiency level

If your education has not been conducted in the English language, you will be expected to demonstrate evidence of an adequate level of English proficiency.

The level of English language proficiency for this programme is: Good. Information about the evidence required, acceptable qualifications and test providers is provided at: www.ucl.ac.uk/graduate/english-requirements

Your application

Students are advised to apply as early as possible due to competition for places. Those applying for scholarship funding (particularly overseas applicants) should take note of application deadlines.

When we assess your application we would like to learn:

// why you want to study Computational Statistics and Machine Learning at graduate level
// why you want to study Computational Statistics and Machine Learning at UCL
// what particularly attracts you to this programme
// how your academic and professional background meets the demands of this programme
// what mathematics and statistics experience you have
// what programming experience you have
// where you would like to go professionally with your degree

Together with essential academic requirements, the personal statement is your opportunity to illustrate whether your reasons for applying to this programme match what the programme will deliver.

There is an application processing fee for this programme of £75 for online applications and £100 for paper applications. Further information can be found at: www.ucl.ac.uk/prospective-students/graduate/taught/application.

FEES AND FUNDING 2019/20 ENTRY

// UK: £13,340 (FT)
// EU: £13,340 (FT)
// Overseas: £28,410 (FT)

The tuition fees shown are for the year indicated above. Fees for subsequent years may increase or otherwise vary. Further information on fee status, fee increases and the fee schedule can be viewed on the UCL Students website.

All full time students are required to pay a fee deposit of £2,000 for this programme. All part-time students are required to pay a fee deposit of £1,000.

Four MSc Scholarships, worth £4000 each, are made available by the Department of Computer Science to UK/EU offer holders with a record of excellent academic achievement. The closing date is 30 June 2018. For more information, please see the department pages.

Full details of funding opportunities can be found on the UCL Scholarships website: www.ucl.ac.uk/scholarships

APPLICATION DEADLINE

All applicants: 14 June 2019

Details on how to apply are available on the website at: www.ucl.ac.uk/graduate/apply

CONTACT

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EU referendum

For up-to-date information relating to specific key questions following the UK’s decision to leave the EU, please refer to www.ucl.ac.uk/brexit