

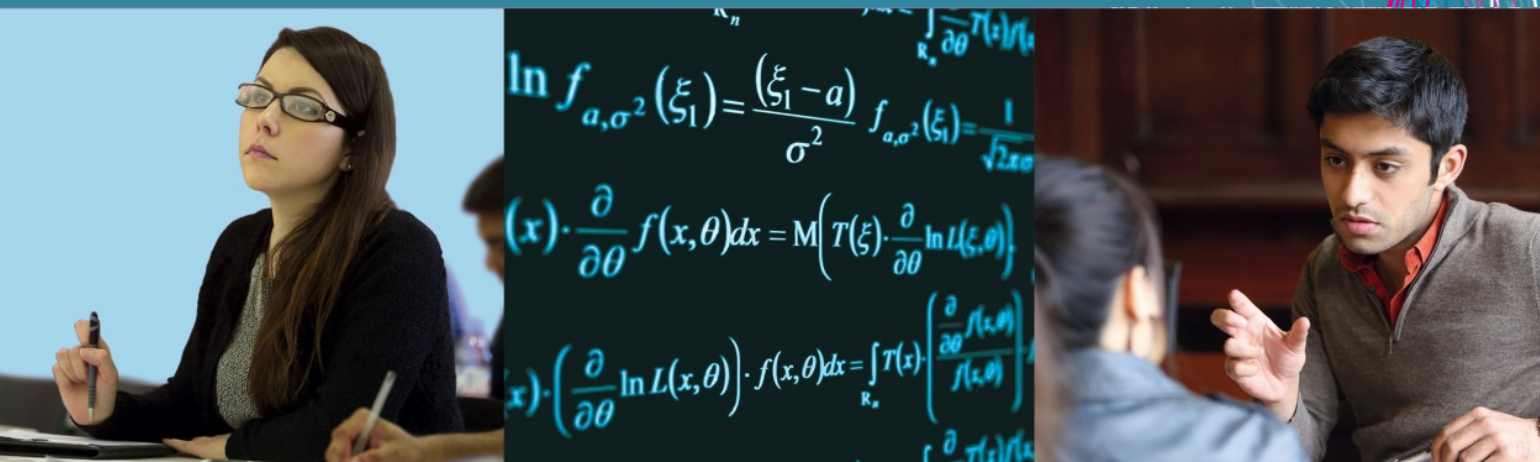


Department
of Mathematics

Relaunched for 2017–18

MSc Operations Research & Analytics

- A one-year, full-time MSc programme, relaunched for 2017-18.
- Designed for students with strong quantitative backgrounds who wish to deepen and broaden their mathematical knowledge, while gaining skills in high demand in the marketplace.
- Graduates will be suited to careers in quantitative positions in consultancy, management, finance, government and business, anywhere in the world.



The MSc Operations Research & Analytics provides participants with the skills needed to apply mathematical methods to real-world analytics problems faced by companies, governments and other institutions. With study in both practice and theory, participants will gain deep insight into analytics problems.

On the practical side, they will learn how to model a range of real-world problems using optimisation, simulation and statistics, using specialist software taught with accompanying computer lab sessions. On the theoretical side, they will learn to recognise the canonical underlying mathematical problems, and discover how to solve them with state-of-the-art methods. Participants will also have the opportunity to undertake a Project in Operations Research & Analytics, working in a consultancy role in a host organisation, where they will turn a real problem faced by the organisation into a mathematical model whose solution provides tangible benefit. Alternatively, they may choose to write a Dissertation, supervised by a faculty member.

The programme aims to:

- provide participants with a thorough grounding in **fundamental concepts and methods** of Operations Research & Analytics;
- provide participants with a thorough understanding of the **practical application of analytic methods** through lectures, seminars and examples, and from the opportunity of a real-world project done under supervision in the final three months of the course;
- offer a range of **intellectually challenging course options** within Operations Research & Analytics, other areas of Mathematics, Statistics and Management;
- **allow specialisation**, including the option of a dissertation as an alternative to the practical project;
- **develop participants' skills** in quantitative analysis and the ability to convey complex ideas clearly.

Programme structure

3 compulsory half units

Fundamentals of Operations Research
introduces a range of Operations Research techniques.

Modelling in Operations Research
covers simulation and optimisation.

Data Analysis and Statistical Methods
covers common techniques of statistical inference (together with theoretical justification).



1 compulsory full unit

Project or Dissertation in Operations Research & Analytics



3 half units of choice

A Mathematics course in analytics (optimisation, algorithms or data mining).

A course from a broader range of Mathematics and Statistics topics.

A course from a range of Management subjects including behavioural decision analysis, marketing and more.

From the Programme Director

Professor Gregory Sorkin

Professor Sorkin is Chair of Management Science and Mathematics. He came to LSE after 25 years at IBM Research, where he published theoretical research on algorithms and random structures, and solved optimisation problems for IBM and its customers.



What is the core learning your students will take away from the programme?

The MSc Operations Research & Analytics is a one-year degree where students learn the fundamentals of business analytics to prepare them for further study or a job in industry. The core content includes modelling – the process of translating real-world practical problems into mathematical terms – and mathematical optimisation, simulation, statistics and, queuing theory, Markov chains, dynamic programming, and other fundamental techniques. Course options include further foundations such as combinatorial optimisation and integer programming and advanced topics such as data mining.

These quantitative, objective, mathematically rigorous and sophisticated methods for optimisation, forecasting and decision-making have become a foundation of modern management in all spheres, including private industry and government, and the skills taught are in strong demand.

How does this programme differ fundamentally from other more technical/practical degrees?

Our faculty conducts international-calibre research in Operational Research and related areas, and our goal is to lead students to understand the

nature of problems and their mathematical underpinnings. The focus is not directly vocational, but at the same time OR is practically oriented, and as an important component of the degree most students perform a consulting-type final project in industry, finance, or the public sector (alternatively, students may write a dissertation). Students have access to a range of course options at LSE, within Mathematics and in Statistics and Management.

‘The mathematically rigorous and sophisticated tools taught are in strong demand from employers worldwide, in all fields of endeavour.’

How does the programme contribute to LSE’s core philosophy, ‘understanding the causes of things’?

OR is a field devoted to solving practical problems arising in industry, finance and the public sector: manufacturing optimisation, revenue management, portfolio optimisation, fleet scheduling, resource allocation, timetabling and many more. At a pragmatic level, this requires understanding the real-world problems so as to be able to model them effectively as more abstract mathematical problems that can be solved by existing methods. At another

level, OR seeks to understand these abstract mathematical problems better in order to solve them more efficiently (and it has been extraordinarily successful in doing so).

What would you say to a prospective student thinking of applying to join the programme?

The new Operations Research & Analytics degree replaces the long-standing MSc Management Science (OR stream). It is now situated in the Department of Mathematics, providing a rich and well-fitting intellectual environment. The course structure has been streamlined and focused, but the degree remains unchanged in nature, with its grounding in applicable mathematics and its inclusion of courses in Management. The programme offers a combination of practical skills and foundational knowledge, through its core courses and a range of options, taught by an OR faculty with industrial experience and at the forefront of research. The mathematically rigorous and sophisticated tools taught are in strong demand from employers worldwide, in all fields of endeavour, one reason that our students are so successful in quickly finding good jobs. Additionally, students can enjoy a wide range of experiences at LSE, including regular public talks by world leaders, and London is an exciting, international city.

About the Department of Mathematics

Head of Department, Professor Martin Anthony



The LSE Department of Mathematics is internationally recognised for its teaching and research. Located within a world-class social science institution, the Department aims to be a leading centre for Mathematics in the Social Sciences. The Department has more than doubled in size over recent years, most notably with the addition of strong new groups working in operations research and analytics, and financial mathematics and control theory. Other fields studied within the Department include discrete mathematics, algorithms and mathematical game theory.

The Department's growth trajectory reflects the increasing impact that mathematical theory and mathematical techniques are having on subjects such as economics and finance, and on many other areas of the social sciences. We are pleased to offer this new MSc in Operations Research & Analytics. For more information on this programme, and the Department generally, please visit our website.

lse.ac.uk/maths

Entry requirements

Applicants should normally have at least an upper second class degree or equivalent in a relevant discipline. This includes applicants with degrees in mathematics or statistics, but also those with degrees in economics, business, finance, engineering, science, or social science subjects. An English language qualification at the School's standard level, where appropriate, is a requirement. Most of our MSc students come directly from an undergraduate degree, but we also welcome applications from those with work experience.

How to apply

Application code: G2U1

Applications are open between mid-October and June. Decisions are made on a rolling, first-come, first-served basis. Most offers are made by February or March, so we encourage you to apply early to avoid disappointment. To apply, please visit the prospective graduate students section of the LSE Website. Apply by April to be considered for a Graduate Student Support (GSS) scholarship.

