

Preparatory Reading List

This short list of resources will be useful if you are seeking a refresher in a particular area of mathematics, as a way to prepare yourself for the kind of work you will be doing when you arrive. It can also be useful if you simply want to start looking at the course material early.

We must emphasise that this reading is **not** compulsory, but we also want to point out that some of our previous students have stated that they would have liked some stronger guidance on the type of material they would be covering.

Accessing resources

It is not necessary to purchase lots of expensive books before you arrive. You should be able to access the books we recommend from an academic library, or from the sources indicated below. If you arrive early, you can access the LSE Library before registration. To do so, you should cut out the temporary pass provided in your Offer Pack and present it to Library reception. Alternatively, you may bring your offer letter to Library reception and staff will issue a temporary pass.

Unless otherwise indicated these books should be available, should you wish to purchase any, from retailers such as Amazon. In some cases, the first chapter is available to read online, through the publisher (search for the book with Google). You may find other sources by searching on Google.

General and Abstract Mathematics

The MSc Applicable Mathematics programme assumes some knowledge of general mathematics. In particular, we expect you to be familiar with reading and writing formal mathematical proofs, and capable of working with abstract concepts. It is likely that your previous degree covered this material, however you may want to refresh your memory. If your previous degree had less mathematical content, then there may be gaps in your knowledge which you should try to fill before starting the MSc course.

At LSE, the material we assume in the MSc Applicable Mathematics course is taught in the courses:

- **MA100: Mathematical Methods** <http://tiny.cc/ma100>
- **MA103: Introduction to Abstract Mathematics** <http://tiny.cc/ma103>
- **MA203: Real Analysis** <http://tiny.cc/MA203>

The links take you to the Moodle pages for the respective courses: click the Login button below 'Guests' to reach the course pages (For MA100 you need the password guest100, for MA203 the link goes to the MA498 course page with password guest498 but the resources you need are there). In each case, the complete lecture notes, exercises, and some past exam papers are online. We suggest that you read briefly through the course syllabus or skim the lecture notes and perhaps look at a past exam paper in order to check that your understanding of the material matches our expectations.

If you feel that parts of the past exam papers look hard, you should spend some time studying the corresponding parts of the above courses before arriving at LSE. You may well find that the resources on the Moodle pages are enough. If not, we recommend the following two books.

- **P J Eccles (1997), *An Introduction to Mathematical Reasoning: Numbers, Sets and Functions*, Cambridge University Press, ISBN 0521597188.**
Parts I to IV give a good and very readable text for those wanting to refresh their abstract mathematics skills in general.
- **N L Biggs (2002), *Discrete Mathematics*, Oxford University Press, ISBN 0198507178.**
This book covers several areas. Chapters 1–7 are good for students who are unsure about their background in abstract mathematics.

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Preliminary reading for specific courses

Indicative and preliminary reading for the core courses MA407 Algorithms and Computation and MA421 Advanced Algorithms are given in the separate document 'Notice regarding MA407 Algorithms and Computation and MA421 Advanced Algorithms'.

The general and abstract mathematics discussed above are prerequisite for all mathematics courses in the MSc programme, and additionally the core course MA407 (or an equivalent course) is a prerequisite for many courses. Where there are further prerequisite courses they are indicated below.

In each case, the lecturer will explain any further concepts required in the lectures. Nevertheless, if you wish to familiarise yourself with the basics, or if you feel your understanding of a specific area is not good, the following resources may be helpful.

The course descriptions on the LSE Mathematics website include an indicative list of books for each of these courses. However you should **not** feel a need to buy these books before starting the course. They are all available from the LSE library, and most are only there to provide an alternative explanation of course content in case you find the lecturer's presentation hard to understand.

MA402: Game Theory I

No prerequisites will be assumed. A good introductory text is

K Binmore (2007), *Playing for Real: A Text on Game Theory*, Oxford University Press, ISBN 0195300572.

This book is an improved version of *Fun and Games* (1991) by the same author.

MA408: Discrete Mathematics and Graph Theory

No prerequisites will be assumed. If you have not seen any graph theory before and want to get used to the kind of concepts that will appear in the course, you could read the first chapter of

R Diestel (2010), *Graph Theory*, Springer-Verlag, ISBN 9783642142789

available free online at <http://diestel-graph-theory.com/>.

MA409: Continuous Time Optimisation

This course assumes knowledge at the level of MA212 Further Mathematical Methods. The Moodle page for MA212 is <http://tiny.cc/MA212>, and the recommended book is

A Ostaszewski (1990), *Advanced Mathematical Methods*, Cambridge University Press, ISBN 0521289645.

MA410: Information, Communication and Cryptography

No preliminary reading is suggested for this course.

MA411: Probability and Measure

No preliminary reading is suggested for this course.

MA412: Functional Analysis and its Applications

This course assumes knowledge at the level of MA212 Further Mathematical Methods. The Moodle page for this course is <http://tiny.cc/MA212>, and the recommended book is

A Ostaszewski (1990), *Advanced Mathematical Methods*, Cambridge University Press, ISBN 0521289645.

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MA413: Games of Incomplete Information

No preliminary reading is suggested for this course. MA402 or an equivalent course is a prerequisite.

MA414: Stochastic Analysis

No preliminary reading is suggested for this course. MA411 or ST409 are prerequisite.

MA420: Quantifying Risk Modelling and Alternative Markets

No preliminary reading is suggested for this course. ST409 is a prerequisite.