LSE Mathematics

MSc in Applicable Mathematics
Preparatory Reading – 2024/25

This list of resources is meant for those of you who feel they will benefit from 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 emphasis that this reading is **not** compulsory. However, we also want to point out that Applicable Mathematics students in the past told us they would have liked some stronger guidance on the type of material they would be covering in their courses.

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 once you pre-enrol and register for the degree online. You will receive information from the Registry Team confirming when you can pre-enrol.

All these books should be available, should you wish to purchase any, from online retailers. In some cases, the first chapter or other parts of a book are available to read online, through the publisher (search for the book with your choice of search engine).

General and Abstract Mathematics

The MSc in Applicable Mathematics programme assumes some knowledge of general mathematics. 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, it's always a good idea 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 programme.

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

- **MA100 - Mathematical Methods**
- **MA103 - Introduction to Abstract Mathematics**
- **MA203 - Real Analysis**

The course content, some lecture notes, sample exam papers with solutions from previous years for MA103 and MA203 can be found on the MSc Applicable Mathematics offer holders/new arrivals page **here**.

We suggest that you read briefly through the course guides, skim the lecture notes, and perhaps look at a past exam paper to check that your understanding of the material matches our expectations.

If the past exam papers for those courses look hard to you, you should spend some time studying the corresponding parts of the above courses before arriving at LSE. Apart from the MA103 and MA203 notes, 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 of this book give a good and very readable text for those wanting to refresh their abstract mathematics skills in general.
- N.L. Biggs (2nd edition, 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 Topics in Algorithms are given in the separate document '*Notice regarding MA407 Algorithms and Computation and MA421 Topics in Algorithms*', that is included in your preliminary information.

If you have little or no programming experience, you are strongly advised to prepare for the MA407 course as detailed in the notice. Students with limited experience who do not prepare typically struggle with that (core) course. If you have programming experience, but not with Python, you should find it easy to adapt.

The general and abstract mathematics discussed above are prerequisites for all mathematics courses in the MSc programme. Additionally, the core course MA407 (or an equivalent course) is a prerequisite for many courses. Some courses have further prerequisites; these are indicated in the course guides found here.