# A2. Metric spaces and complex analysis
Mathematical Institute, University of Oxford.
Michaelmas Term 2018

**Course information**

Complex analysis is a beautiful topic and a central one in mathematics. While it builds on Prelims analysis it has a different flavour because of the richer geometry of the complex plane. It connects to many disparate parts of both pure and applied mathematics, as you will discover in a range of courses you can take later in your degree.

The first part of the course, approximately 10 lectures, is the more abstract, focusing on what are called "metric spaces": a set equipped with a notion of distance. In this part of the course we will revisit notions you studied in Prelims Analysis, putting them into a vastly more general context. The remainder of the course will focuses on the complex plane, and the study of complex-differentiable functions.

Notes for the course will be placed online in the Maths Institute Course Materials website. divided into three tranches. There will be 8 problem sets, also posted on the Course Materials website. If you spot any misprints or other errors in the online notes or problem sets please inform me via email at mcgerty@maths.ox.ac.uk.

There are a number of excellent textbooks on the subject. A few of the ones you might consult include:

- *Introduction to Metric and Topological spaces*, W.A. Sutherland. O.U.P.

  *For the first part of the course on metric spaces – does all we need and much more – also useful if you take next term's Topology course.*

- *From Real to Complex Analysis*, R. H. Dyer, D. E. Edmunds, Springer.

  *This starts with a review of the Riemann integral, and then discusses metric spaces before covering Complex Analysis. It thus follows the pattern of our course quite well.*

- *An Introduction to Complex Analysis*, H. A. Priestley. O.U.P.

  *A well-written introductory text written by one of Oxford's own.*

  *Real and Complex Analysis*, W. A. Rudin.

  *A classic text, but rather dense and a bit more advanced in perspective than our course.*

- *Complex Analysis*, Princeton Lecture in Analysis II, E. M. Stein & R. Shakarchi. P.U.P.

  *Informally written and approachable text which covers many more topics than we will have time for.*

- *Complex Analysis*, I. Stewart, D. Tall. C.U.P.

  *Introductory text, at a similar level to Priestley.*

Note that there is a list of (very minor) corrections to the latest edition to Prof. Priestley's book which can be found on her website, https://people.maths.ox.ac.uk/hap.

Kevin McGerty,
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