

# Complex Dynamics (L24)

Holly Krieger

This course will introduce the study of iteration of rational functions of one complex variable. We will cover the local theory and the global theory, and introduce key modern ideas in the field to form a basis for further study.

## Pre-requisites

Essential: IB Complex Analysis, IB Metric and Topological Spaces, II Riemann Surfaces, II Probability and Measure (the measure theory bit).

Helpful: IB Geometry, II Algebraic Topology, II Dynamical Systems.

## Literature

Milnor and Douady-Hubbard (below) are the primary resources. At some points of the course, particularly in the final two weeks, there will be material presented which is not covered in textbooks.

1. J. Milnor, *Dynamics in One Complex Variable*. Any version is fine, including the early online version available on the arXiv:

<https://arxiv.org/pdf/math/9201272.pdf>

2. A. Douady and J. H. Hubbard, *Exploring the Mandelbrot Set - Orsay Notes*, Available at

<http://pi.math.cornell.edu/~hubbard/OrsayEnglish.pdf>

Additional resources for students seeking more detailed (in the first instance) or more accessible (in the second instance) presentations of mostly the same material:

1. A. Beardon, *Iteration of Rational Functions*. Springer, 1991.
2. L. Carleson, T. W. Gamelin, *Complex Dynamics*. Springer, 1993.

## Additional support

Four examples sheets will be provided and four associated examples classes will be given. There will be a one-hour revision class in the Easter Term.

The lecturer may be contacted by email at [hkrieger@dpms.cam.ac.uk](mailto:hkrieger@dpms.cam.ac.uk).