LTCC Basic Applied Course

Title: **Models**
Lecturer: Oliver Kerr, City
Email: o.s.kerr@city.ac.uk

Description: The course will examine the basic principles behind modelling and will look at a variety of qualitative and quantitative models. Some of these will be chosen to point towards the other topics (Applied Dynamical Systems, Analytical Methods, Computational Methods, Bio-Mathematics) but not to cover the same material.

Basics:
Continuum hypothesis
Dimensional analysis (Buckingham's theorem)
Self-similarity

Qualitative models: models that mimic some aspect of a physical system to give a qualitative understanding (and possibly some quantitative behaviour)

Possible examples:
Earthquake dynamics
Icing models

Quantitative models: models that aim to include all relevant physics to get a quantitative model.

Possible examples:
Numerous possibilities from the books listed below [chosen to give a cross section of the types of problems and the approaches to solutions].

Literature:
E. Cumberbatch and A. Fitt, Mathematical Modelling --- Case Studies from Industry, CUP.
A.C. Fowler, Mathematical Models in the Applied Sciences, CUP.
J. Ockendon, S. Howison, A. Lacey and A. Movchan, Applied Partial Differential Equations.