Expected Background – MSc Applied Mathematics

Formal entry requirements are listed here but since applicants come from many different backgrounds, it will be useful to consider yourself whether you feel as if you have the right background for the course. Some general expectations are listed below, with references to existing courses on that material in Manchester. It should hopefully give you a feel for the course and what is expected of the incoming student. We would only consider a few of these courses as absolutely essential, but some additional background is desirable and will certainly assist you greatly for course preparation. If in doubt then please contact us.

A good background in basic vector calculus and ordinary differential equations is essential; see for example the two courses Calculus and Vectors A and Calculus and Applications A . Note that this second course has introductory mechanics elements within it and although not absolutely essential, students without this training may find aspects of the MSc course difficult, especially if you wish to go down the industrial modelling route.

As with most Applied Mathematics MSc programmes, a higher level in vector calculus and applied mathematical methods is highly desirable; see for instance the content of Partial differential equations and vector calculus . Knowledge of solving partial differential equations numerically is desirable but not essential as this is taught on the course.

Knowledge of basic linear algebra is essential. For example we would expect incoming students to have taken a basic linear algebra course such as Linear Algebra A . Higher level training in numerical linear algebra such as Numerical Analysis 1 is useful but is not essential.

If you wish to go down the numerical analysis route, any additional courses that you have taken in this area would be useful. For example, the material in Matrix analysis and Numerical analysis 2 is helpful, but not essential.

Although there is no formal requirement for previous programming experience, a familiarity with writing computer programs (for example, in Python, MATLAB, C/C++ or Java) is highly desirable. Working through self-study websites such as http://www.learnpython.org or http://www.learncpp.com/ is useful practice.

A basic knowledge of real and complex analysis is helpful; see e.g.
Real and Complex Analysis . Higher level complex analysis courses such as Applied Complex Analysis are not essential but are useful, especially as background material for the Methods and PDEs units on the MSc. Some further knowledge of mathematical methods such as courses in PDEs and asymptotic expansions or perturbation methods would also be helpful but not absolutely essential.

The modules in Uncertainty Quantification require no previous experience in probability or statistics, but a good text for preparatory reading is "An Introduction to Statistical Computing" by Jochen Voss.

If you wish to go down the industrial modelling route, any additional courses that you have taken in continuum mechanics style courses such as Fluid Mechanics , Elasticity , Viscous Flow , and Waves would be good as background but are not essential prerequisites.