Maths and statistics

The Master of Finance is open to graduates of any discipline, so long as they can show a willingness to reach the necessary level of maths and statistics. There are plenty of people with degrees in the arts and humanities who have excelled and reached the highest positions in finance. Such people are often successful because they have a broad intellectual range. But finance is irreducibly somewhat mathematical and technical.

The guidelines below provide specific advice about the level of knowledge needed to complete the course.

Introduction

There is no formal assessment, but you should be familiar with the topics below ahead of starting the course. We have provided some suggested books and reading that cover this material.

Prior to the start of the programme, enrolled students will be invited to complete a maths and statistics test to provide individual feedback on their quantitative skills. The test is not formally assessed but will allow you to revisit some of the basic skills. Your grade in this test will not count towards the programme and will be available when you arrive at the start of induction.

Maths and statistics pre-course

The maths and statistics pre-course is included as part of the Master of Finance induction. The pre-course assumes you have covered the key topics before and aims to refresh your knowledge. All the topics and questions on the pre-test will be taught and reviewed in the pre-course lectures.

Here we provide guidance on the maths, statistics and Excel spreadsheet skills you will need to cope with the Master of Finance course content. We specify:

1. a set of maths topics that you should have already covered before, and be able fairly quickly to refresh your memory of; if you find this material difficult or hard to remember then you are probably not going to find the course feasible;
2. an additional set of topics that you may not have covered before but you may wish to familiarise yourself with ahead of starting the course;
3. you should have a reasonably strong set of skills in using Excel (or any similar spreadsheet package); there are some specific topics which you should also have become familiar with before starting the course.

1. Prerequisites for applying (mostly equivalent to UK Maths AS level)

- Algebra: quadratic equations and their solutions; indices; simultaneous equations; inequalities.
- Functions, graphs and function sketching.
- Calculus: differentiation & integration; maxima & minima; second order conditions.
- Natural logs and exponential functions (ex).
- Statistics: descriptive statistics mean/median/mode and standard deviation; normal and binomial distribution; basic probability and expectation; sampling and estimation.
- Simple linear regression.

2. Additional topics you may wish to review (you do not need to cover these topics before the course)

- Multivariate calculus, partial differentiation and Taylor series.
- Maxima and minima in multivariate calculus.
- Simple differential equations.
- Rules for means and variances of combinations of variables.
- Multiple regression and assumptions needed for estimates to efficient and unbiased; t- statistics.
- Simple linear algebra (matrix multiplication and solution of simultaneous equations).

3. Excel topics

In addition to basic skills: use of statistical functions (mean, median, mode, standard deviation, covariance, correlation); NPV and FV; random numbers; normal distribution; charts.

Suggested maths and statistics books

There are very many books on mathematics and statistics that cover the material needed for the course (and a great deal more – it isn't necessary to study these books from cover to cover). A successful book should be accessible and give plenty of worked examples and exercises with answers for a student to work through. Most maths of this type is self-taught – you just have to practice.

You are not expected to complete any of the pre-reading or preparation before joining the programme. If you wish to refresh your maths and statistics knowledge, we have provided a list of suggested books and further reading below. All the topics below will be covered during the maths and statistics pre-course in the induction.

A selection of maths and statistics books

Knut Sydsaeter, Peter Hammond, Arne Strom, Andrés Carvajal (2016); Essential Mathematics for Economic Analysis. 5th ed. Harlow, England: Pearson; ISBN-10 1292074612, ISBN-13 978- 1292074610;

Simon, Carl P., and Lawrence Blume. 1994; Mathematics for economists. New York: Norton

Stock, J. and Watson, M. (2019); Introduction to Econometrics. 4th ed. Harlow: Pearson

Wooldridge, J. M. (2020); Introductory Econometrics: A Modern Approach. 7th ed. Mason, Ohio: Thomson South-Western; 6th ed

Clare Morris (2011); Quantitative Approaches in Business Studies. 8th ed. Harlow, England; New York: Financial Times, Prentice Hall ISBN-10 0273738720, ISBN-13 978-0273738725

Algebra, Equations, Functions Review

Topics:

- Algebra Review: Powers, Absolute Value, Equations, Inequalities, Summation, Effective Interest Rate, Discrete and Continuous Compounding, Present Value, Future Value.
- Functions: Linear, Quadratic, Power, Exponential and Logarithmic.

Suggested reading: S&H Chs, 2, 3 and 4, 10

Differentiation and Integration

Topics:

- The concept of derivative, basic rules, chain rule, partial derivatives.
- The concept of Integral and basic rules for integration.

Suggested reading: S&H Chs 6, 9, and 11

Optimisation and Introduction to Matrix Algebra

Topics:

- Single and Multiple variable optimisation, necessary and sufficient conditions.
- Constrained Optimisation.

Suggested reading: S&H Chs 13, 14, 15

Statistics and Probability, and Introduction to Regression Analysis

Topics:

- Discrete Random Variables, Continuous Random Variables, Probability Density Function, Cumulative Distribution Function.
- Statistical measures. From Sample to Population – Hypothesis Testing and Confidence Interval.
- Introduction to the Simple Regression Model: notation, interpretation, estimation, inference and goodness-of-fit

Suggested reading: W, J.M. Chs 2, 3, 4.