



# MSC INTERNATIONAL FINANCE

Program Prerequisites

Finance is a quantitative field. Mathematics is necessary to master financial concepts and communicate ideas clearly. Strong analytical skills are necessary both for quantitative jobs in markets and corporate finance. In addition to mathematics, finance requires a solid foundation in the fields of economics and accounting.

The MSc International Finance at HEC Paris is a generalist program. Students come from a variety of backgrounds. While this diversity is one of the defining strengths of the program, it also implies that students have various prior knowledge of fundamental tools and concepts in mathematics and finance. When some students' prior knowledge of these tools is not up to par, this hinders the learning process for the whole class.

To avoid such undesirable outcomes, the finance faculty has identified a list of pre-requisite topics and concepts. Table 1 below lists the required prerequisites for all students. Table 2 lists additional prerequisites required for students who apply for the Business Track. Enrolling students are expected to have a mastery of the skills and techniques listed in tables 1 and 2. Those students who would like to apply to the program but who do not have a solid foundation in these skills and techniques are advised to work to acquire them before joining the program.

**Table 1**  
**Pre-requisites for all students applying to MSc International Finance**

<i>Area</i>	<i>Topic</i>
<i>Analysis</i>	Functions of one or several variables
	Differentiability
	Limits
	Integration
	Integration by parts
	Monotonicity
	Concavity
	Chain rule
	Common functions (power, exponential, log, etc.
	Static optimization (first order condition, second order condition, Lagrangian, etc.)
<i>Linear Algebra</i>	Operations in $\mathbb{R}^N$
	Solving linear systems
	Matrices
	Determinants
	Rank
	Matrix inversion
	Operations with matrices and vectors
<i>Probability and statistics</i>	Probability space
	Event
	Basic operations related to event probabilities (intersection, union, independent events, etc.)
	Conditional probability
	Bayes law
	Discrete and continuous random variables
	PDFs and CDFs
	Conditional distributions
	Expectation, variance, median, quantiles
	Correlations
	Standard distributions (Uniform, Gaussian, Exponential)
	OLS regressions
	Statistical hypothesis testing

**Table 2**  
**Additional pre-requisites for students applying for the Business Track of the MSc**  
**International Finance**

<i>Area</i>	<i>Topic</i>
<i>Economics</i>	Utility function
	Consumer choice
	Profit maximization
	Marginal cost and marginal utility
	Market equilibrium
	Equilibrium conditions
	Pareto optimality
	Marginal rate of substitution
	Externalities
	Decision-making under risk
	Welfare
	Basic game theory (Nash equilibrium)
	Asymmetric information, adverse selection, moral hazard
<i>Accounting</i>	Assets & liabilities
	Definition of equity and debt
	Balance sheet identities
	Income statement
	Cash flow
<i>Finance</i>	Time value of money; discounting and compounding
	Pricing of basic financial instruments such as stocks and bonds
	Modigliani-Miller theorem
	Cost of capital
	Capital budgeting
	Impact of frictions (asymmetric information) on financial decisions