



BSC. in FINANCIAL MATHEMATICS & ECONOMICS

FIRST YEAR

Code	Course title	Hours per week	Credits
MA 180	Mathematics	4	15
EC 101/2	Economics	3	15
CS 103	Computer Science	2	11
MA 110	Statistics & Probability	2	7.5
MA 111	Mathematics of Finance I	2	7.5
MP 191	Mathematical Methods I	1	4
	Total	14	60

MA180 Mathematics

Mathematics is divided into two areas:

Analysis: Functions of one real variable: Construction of \mathbb{R} . countable and uncountable sets. Sequences and limits, limits of sums and products, the geometric and Dirichlet series, continuous and discontinuous functions, the intermediate value theorem, inverse functions. Mean-value theorem, Taylor's theorem. Sequences and Series, tests, power series, products of series, exponential and logarithmic functions. Riemann Integration.

Algebra: Elementary number theory: primes, factorisation, the division algorithm, greatest common divisors, arithmetic modulo m , solution of congruences, applications. Transformations of the plane: linear transformations, isometrics, symmetries. Introduction to groups, rings, fields: examples from earlier topics, cyclic groups, Lagrange's theorem, polynomials. Basic matrix algebra: multiplication, adjoint, determinant, inverse, eigenvalues and eigenvectors.

EC101/2 Economics

Economics is divided into two areas:

Microeconomics: This course is an introduction to the principles of microeconomics. It studies the decisions of individual households and firms. It also analyses how individual markets operate..

Macroeconomics: This is an introductory course in macroeconomics. The interrelationship of the various actors in the aggregate economy is studied. Also, the derivation of certain national aggregates is studied using simple models of the overall economy.

CS103 Computer Science

Introduction to programming: Programming in a high level language (such as C), algorithms, variables, expressions, syntax, implementation of programs on machines, loops, procedures, function, modular programming, recursion, introduction to systems software, compilers, batch and on-line processing modes.

MA110 Statistics & Probability

Explanation of statistics through practical examples of its applications.

Data summarisation and presentation: Numerical measures of location and spread for both ungrouped and grouped data; graphical methods including histograms, stem-and-leaf and box plots.

Probability: The role of probability theory in modelling random phenomena and in statistical decision making; sample spaces and events; some basic probability formulae; conditional probability and independence; Bayes formula; counting techniques; discrete and continuous random variables; hypergeometric and binomial distributions; normal distributions; the distribution of the sample mean when sampling from a normal distribution; the Central Limit Theorem with applications including normal approximations to binomial distributions.

Statistical Inference: Concepts of point and interval estimation; concepts in hypothesis testing including Type I and Type II errors and power; confidence intervals and hypothesis tests about a single population mean, a single population proportion, the difference between two population means, a single population variance and the ratio of two population variances; the analysis of enumerative data, including chi-squared goodness-of-fit and contingency table tests; correlation and linear regression analysis, including least squares estimation of the parameters of the simple linear regression model, inferences about these parameters, and prediction.

MA111 Mathematics of Finance I

Simple and compound interest, annuities certain and variable, perpetuities, amortisation schedules, sinking funds.

MP191 Mathematical Methods I

Linear differential and difference equations. Applications to the modelling of population, economic, mechanical and financial systems. Introduction to the phase plane method.