



BSc. in Financial Mathematics & Economics

Second Year Courses

SEMESTER I

Code	Course title	Hours per week	Credits
MA 284	Discrete Mathematics	2	5
MA 286	Analysis I	2	5
MA 235	Probability	2	5
EC 215	Microeconomics	3	5
MP 291	Mathematical Methods II	2	5
CS 204	Algorithms	1	5
	Total	12	30

SEMESTER II

MA 283	Algebra Mathematics	2	5
MA 287	Analysis II	2	5
MA 236	Statistical Inference	2	5
EC 217	Macroeconomics	3	5
EC 218	Mathematical Economics	2	5
CS 207	Languages and Operating Systems	1	5
	Total	12	30

MA284 Discrete Mathematics

Enumeration: product rule, sum rule and sieve principle, selections and distributions, pigeonhole principle. Graphs, the fundamentals, plus a study of some of the following topics: colouring problems, bipartite graphs, Hamiltonian graphs, planar graphs and tournaments. Algorithms and applications are emphasised throughout.

MA286 Analysis I

Revision of the main definitions and properties of sequences and series of real numbers. \liminf and \limsup , power series, differentiation term by term, Abel's limit theorem, Taylor series. Continuity and differentiability of a function, partial derivatives, directional derivatives, the Chain rule, the mean-value

MA235 Probability

Probability spaces; random variables and vectors, their distributions and moments; functions of random variables; sampling distributions; limit theorems.

EC215 Microeconomics:

The course is primarily focused on consumers, households and welfare. We review the Neo-classical (orthodox) and non neo-classical (loosely defined as Institutional) theories of consumer behaviour and their implications for the government's policies, where the latter are assumed to have as their objective the welfare of its citizens.

MP291 Mathematical Methods II

Ordinary differential equations including the Laplace transform. Phase plane analysis. Linear stability theory. Fourier series. Introduction to partial differential equations. Optimisation with constraints including the Lagrange multiplier method.

CS204 Algorithms

Theory of computation: Turing machines, complexity, computability, decidability.

Design and analysis of algorithms: set operations, tables, stacks, queues, trees, searching and sorting, file organisation.

MA283 Linear Algebra

Vector spaces, bases, dimension, linear maps, matrix representation of linear maps, matrix algebra, kernels and images, least squares fitting, inner product spaces, the Gram-Schmidt process, Fourier series, dual spaces, the rank of a matrix, determinants, eigenvalues and eigenvectors, the characteristic polynomial, quadratic forms, diagonalisation of a symmetric or Hermitian linear map, triangularisation of a linear map, the Hamilton-Cayley theorem, linear programming.

MA287 Analysis II

Functions of a complex variable: differentiability, the Cauchy-Riemann equations, harmonic conjugates, line integrals, $\log z$ and e^z , Cauchy's integral theorem, Cauchy's formula. Cauchy's inequalities, the Laurent series of a function, poles, residues, contour integration, Rouché's theorem.

MA236 Statistical Inference

Concepts and criteria in point and interval estimation and in hypothesis testing; applications to one- and two-sample problems involving quantitative variables, enumerative data analysis, and regression.

EC217 Macroeconomics

This is an intermediate macroeconomics course dealing with the theory and practice of macroeconomics. It builds on the concepts and principles covered in 1st Year Economics. The objective of the course is to understand, in more detail, the core principles of macroeconomic theory and to learn how these basic principles can be applied to various policy issues, both domestically and in an international setting.

EC218 Mathematical Economics

Applications of mathematical methods in constructing and analysing economic models, with an emphasis on methods of constrained optimisation. Topics may include comparative static analysis, economic dynamics and game-theoretic methods in economics.

CS207 Languages and Operating Systems

Operating Systems: Introduction to VMS, UNIX, MSDOS. Database management systems: architecture of DBMS, data sublanguages, commercially available DBMSs. Study of programming languages.