

BSc. in Financial Mathematics & Economics

Third Year Courses

SEMESTER I

Code	Course title	Hours per week	Credits
EC 349	Economic Theory	2	5
MA 322	Applied Statistics	2	5
MA 341	Metric Spaces	2	5
EC 369	Money and Banking	2	5
MA 343	Groups I	2	5
MA 311	Annuities and Life Insurance	2	5
	Total	12	30

SEMESTER II

EC 385	Advanced Economic Theory	3	5
EC 363	Econometrics	2	5
EC 362	Economics of Financial Markets	2	5
MP 391	Mathematical Modelling	2	5
MA 342	Topology	2	5
MA 310	Actuarial Mathematics I	2	5
	Total	13	30

EC349 Economic Theory

The microeconomics part looks at the diverse applications of rational choice theory in competitive market contexts, culminating with general equilibrium theory. Topics covered in the macroeconomics part of the course will include macroeconomic indicators in the European Union (EU); the interaction of goods, labour and money markets in an economically integrated area; and macroeconomic policy implications of the business cycle in open economies.

MA322 Applied Statistics

Sampling techniques; various designs and analyses for survey data; applied regression analyses; simple linear regression, multiple linear regression, diagnostics and remedial measures for violations of assumptions; experimental design and analysis of variance; principles of experimental designs, completely randomised, randomised block and Latin square designs and their analyses; use of computer software.

MA341 Metric Spaces

Diverse topics, including continuity, convergence, compactness, sequential compactness, the Lebesgue number of a covering completeness, Cantor's theorem, and Baire's theorem.

EC369 Money and Banking

This course develops your understanding of international banking and monetary institutions. It course explores a variety of current issues, including: the role of the new Irish Financial Regulator; how banking and currency crises have occurred around the world; the roles of the International Monetary Fund (IMF) and the European Central Bank (ECB).

MA343 Groups I

Group axioms, cyclic groups, permutation groups. Normal subgroups, homomorphisms, isomorphism theorems. Direct products, finite Abelian groups. Automorphisms, groups of automorphisms.

MA311 Annuities and Life Insurance

Elements of probability and applications to life contingencies; force of mortality; construction of mortality tables; types of life annuities and life insurance; commutation functions; net premiums.

EC385 Advanced Economic Theory

The microeconomic part explores a broader view of markets and human behaviour. Specifically, the implications for efficiency and welfare of market power, missing markets, imperfect information and bounded rationality will be addressed. Macroeconomic topics include advanced treatment of consumption and investment expenditure, monetary policy and economic growth.

EC363 Econometrics

The aim of this course is to give students a practical introduction to some of the main methods used by Economists to quantify relationships between economic variables. Using appropriate software and real data sets, theory learned in the classroom is quickly put into a practical context. Towards the end of the course students build their own Econometric model.

EC362 Economics of Financial Markets

This course introduces students to the key concepts and current issues in financial economics. Particular emphasis is placed on linking the financial theory to the major global economic and business stories of recent years, e.g. the rise and fall of world stock and bond prices; the volatility of the euro-dollar exchange rate; and how billions of euro were lost in derivatives-related trading.

MP391 Mathematical Modelling

Diverse areas are modelled mathematically and computationally, including population models, network maximal flow/minimal cost models, diffusion processes, linear / non-linear programming, queuing theory via Markov processes, random number generators and Monte Carlo methods, Steiner tree problems, and applications to financial and economic models.

MA342 Topology

Continuity and homeomorphism, subspaces, bases and sub-bases, product spaces, compactness, connected and path-connected spaces, paths in a topological space, the fundamental group of the circle.

MA310 Actuarial Mathematics I

This course covers the fundamentals of actuarial mathematics, as well as project appraisal; investments; compound interest; arbitrage and forward contracts; and the term structure of interest rates.