

MSc IN ECONOMICS

Mathematical Statistics: 1996

This course, which is held in the first semester, proposes to revise and upgrade the knowledge of Mathematical Statistics possessed by MSc candidates who are specialising in Econometrics or Finance.

It is also envisaged that students who are following other options with the MSc program and who already have some background in mathematics and statistics, or who have an enthusiasm for these subjects, might participate in the course. The nature and content of this course will be varied to accommodate the skills and experience of those who opt to take it.

The topics to be treated are as follows:

Foundations of Probability

Sets and Set Operations, Limits and Sequences, Probability Measure, Random Variables, Conditional Probability, Independence.

Probability Distributions

Distributions Functions and Density Functions, Moments, Characteristic Functions and Moment Generating Functions, Multivariate Density Functions, Moments of a Multivariate Distribution.

The Normal Distribution and Associated Distributions

The Multivariate Normal Distribution, Distributions Associated with the Normal Distribution, Quadratic Functions of Normal Variates, The Decompositions of a Chi-square Variate.

Basic Limit Theorems

Stochastic Convergence, The Law of Large Numbers for Independent Random Variables, the Central Limit Theorem for i.i.d Random Variables.

Dependent Sequences

Martingale Sequences, Martingale Convergence, Law of Large Numbers for Martingales Martingale Central Limit Theorem, Mixing Sequences, Stationary Sequences and Ergodicity.

The Theory of Estimation

Maximum-Likelihood Estimation, The Consistency of the Maximum-Likelihood Estimator, The Efficiency and Asymptotic Normality of the Maximum-Likelihood Estimator.

Inference and Hypothesis Testing

Confidence Intervals, Hypothesis Tests, The Neyman–Pearson Theory

BIBLIOGRAPHY

- [1] Grimmet, G. and D. Walsh, (1986), *Probability: An Introduction*, Clarendon Press, Oxford.
- [2] Grimmet, G. and D.R. Strizaker, (1982), *Probability and Random Processes*, Clarendon Press, Oxford.
- [3] Mood, A.M. and F.A. Graybill, (1963), *Intoduction to the Theory of Statistics*, McGraw–Hill, New York.
- [4] Hogg, R.V. and A.T. Craig, (1971), *Intoduction to Mathematical Statistics, Third Edition*, Collier- McMillan, London.
- [5] Hoel, P. , (1962), *Intoduction to Mathematical Statistics, Third Edition*, John Wiley and Sons, London.