

School of Oriental and African Studies
Department of Economics

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Preliminary Statistics Course Outline and Reading List

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Lectures: 10.00-13.00 daily
Sep. 18th - Sep. 25th (inclusive)
Room V111 (Vernon Square)

1 Course Aims

The course is intended to be a refresher course in mathematical statistics. The material covered refers to some of the basic statistics normally taught in the undergraduate programme of a BSc Economics degree.

2 Course Objectives

The learning objectives of this course are:

- Be familiar with summations operator, the expectations operator and the rules of expected value, variance and covariance.
- Use frequency tables and histograms to describe data sets.
- Use measures of central tendency (mean, median, mode), dispersion (variance, standard deviation), and simple bivariate statistics (covariance and correlation).
- Understand basic probability theory and be familiar with the concept of random variables.
- Use joint, marginal and conditional probability distributions to verify statistical independence.
- Use statistical tables of probability distributions - normal, standard normal, chi-squared, t and F.
- Understand the desirable small and large sample properties of estimators.
- Use point and interval estimation.
- Use hypothesis testing.

3 Outline of Topics

1. Descriptive Statistics

- 1.1 Some Preliminaries
- 1.2 Types of Data, Levels of Measurement
- 1.3 Numerical Summary statistics
- 1.4 Graphical Techniques

2. Probability Theory and Random Variables

- 2.1 General Probability Theory
- 2.2 Probability Rules/Axioms
- 2.3 Bayes Theorem
- 2.4 Random Variables
- 2.5 Marginal, Joint and Conditional Distribution
- 2.6 Characteristics of Probability Distributions

3. Probability Models and Distributions

- 3.1 Discrete and Continuous Distributions
- 3.2 Normal and Standard Normal Distributions
- 3.3 Normal related distributions (Chi-squared, t, F distributions)

4. Estimation and Confidence Intervals

- 4.1 Point and Interval Estimation
- 4.2 Properties of Estimators
- 4.3 How to calculate confidence intervals

5. Hypothesis Testing

- 5.1 Basic Concepts in Hypothesis Testing
- 5.2 Simple and Composite Hypotheses
- 5.3 Statistical Test
- 5.4 Type I and Type II Errors

4 Reading List

The topics in the course are covered in any standard statistical textbook. The following are a few specific recommendations, though you may well already have a book covering the topics from your undergraduate degree.

Gujarati, D. N. and D.C. Porter (2009). Basic Econometrics, 5th Edition, McGraw-Hill.

The ‘Appendix A: Review of Some Statistical Concepts’ of this book covers the material in the statistics component of the course. This textbook could be also useful for the Quantitative Methods 1 module in the MSc program.

Barrow, M. (2009). Statistics for Economics, Accounting and Business Studies. Prentice Hall, 5th edition.

This is a very readable book which covers the Pre-session course material with lots of examples, particularly good for the descriptive statistics part.

The following two books could also serve useful for the Research Methods 1 module for the MSc Political Economy of Development.

Thomas, R.L. (2005). Using Statistics in Economics, McGraw-Hill.

Agresti, A. and B. Finlay (1999). Statistical Methods for the Social Sciences. Upper Saddle River, N.J.: Prentice Hall.

Some additional readings useful for the Quantitative Methods module as well as the Pre-sessional course are:

Wooldridge, J.M. (2009). Introductory Econometrics: A Modern Approach. South-Western: Cengage Learning, 4th edition.

Gujarati, D.N. (2009). Basic Econometrics. Boston: McGraw-Hill, 5th edition.

Stock, J.H. and M.W. Watson. (2012). Introduction to Econometrics. Harlow: Pearson Education, 3rd edition