Paper 02: STATISTICAL METHODS IN ECONOMICS –I

Course Description

This is the first of a two-part sequence on statistical methods. It begins with some basic concepts and terminology that are fundamental to statistical analysis and inference. It then develops the notion of probability, followed by probability distributions of discrete and continuous random variables. The semester concludes with a discussion of joint distributions.

Course Outline

1. Introduction and Overview
The distinction between populations and samples and between population parameters and sample statistics; the use of measures of location and variation to describe and summarize data; population moments and their sample counterparts.

2. Elementary Probability Theory
Sample spaces and events; probability axioms and properties; counting techniques; conditional probability and Bayes' rule; independence.

3. Random Variables and Probability Distributions
Defining random variables; probability distributions; expected values of random variables and of functions of random variables; properties of commonly used discrete and continuous distributions (uniform, binomial, normal, poisson and exponential random variables).

4. Random Sampling and Jointly Distributed Random Variables
Density and distribution functions for jointly distributed random variables; computing expected values; covariance and correlation coefficients.

Readings:

1. Jay L. Devore, Probability *and Statistics for Engineers,* Cengage Learning, 2010.
2. John E. Freund, *Mathematical Statistics*, Prentice Hall, 1992.
3. Richard J. Larsen and Morris L. Marx, *An Introduction to Mathematical Statistics and its Applications,* Prentice Hall, 2011.

Subject: B.A. (Hons.) Economics
Date: 27.7.2011
Minutes of the course meeting for **Paper number 03** "Statistical Methods in Economics I''
Convenors: J.V. Meenakshi and Param Jit

Purpose: To determine course readings and marks distribution for the semester-long course

The following members present:

1. Malini Sharma, Daulat Ram College
2. Archana Jain, DCAC
3. Kamlesh Gupta, IP College
4. Ratika Datta, PGDAV College
5. Sangya Ranjan, Satyawati (Eve.)
6. Stuti Gupta, Shyam Lal (Eve.)
7. Ajay Gupta, Shyam Lal (Eve.)
8. Ravish, Hindu College
9. Kamlesh Aggarwal, SPM College
10. Chandra Goswami, Dyal Singh College
11. Gurpinder Kaur, SBSC
12. Harish Dhawan, Ram Lal Anand (Eve.)
13. N. Raghunathan, St. Stephen's College
14. Bijoyata Yonzon, Janaki Devi Memorial College
15. Devika S. Tewari, Lady Shri Ram College
16. V.A. Rama Raju, Sri Venkateswara College
17. Ashish Taru Deb, College of Vocational Studies

As noted in the syllabus passed by the Academic Council, the semester system would entail the following contact hours and scheme of assessment:

Contact Hours: Each course will have 5 lectures and 1 tutorial (per group) per week The size of a tutorial group will be 8-10 students

Assessment: Each paper will caryy 100 marks of which the End Semester Examination will be 75 marks and the Internal Assessment will be worth 25 marks. Internal Assessment will comprise 2 Class Tests of 10 marks each and 5 marks for Attendance.

The topic-wise reading list (with marks distribution in parentheses) is as follows:

Topic I: Elementary Distribution Theory (18 marks)
Univariate frequency distributions, measures of location (excluding harmonic mean), dispersion, first four central and non-central moments; skewness and kurtosis.
Readings: K&P: Ch 3, W: Ch 3 Sp: Chs. 3,4, 5

Topic II: Elementary Probability Theory (18 marks)
Concepts of sample space and events, probability of an event; addition and multiplication theorems; conditional probability and independence of events; Bayes rule.
Readings: K&P: Ch 4; W: Chs 4, 5 6; Sp: Chs 6 & 7

Topic III: Probability distributions (27 marks)
Concept of a random variable, joint, marginal and conditional distributions; mean and variance of a random variable; covariance and correlation; independence of random variables; uniform, binomial and normal distributions.
Readings: K&P: Ch. 4; W: Chs 4, 5, 6, 11.7; Sp: Chs 6 & 7

Topic IV: Index Numbers (12 marks)
Concept of an index number, Laspeyres, Paasche's and Fisher's index numbers; time reversal, factor reversal and circular tests; chain base index; problems in constructing index numbers; splicing, base shifting; and use of index numbers for deflating other series.
Readings: K&P: Ch 11 (excl 11.9-11.2) ; W: Ch 13.7-13.8; Sp: Ch 19

Readings

1. K&P: P.H. Karmel and M. Polasek (1978), *Applied Statistics for Economists,* 4th edition, Pitman.
2. W: Allen Webster (1997), *Applied Statistics for Business and Economics: An Essential Version*, 3rd edition, McGraw-Hill.
3. Sp: M.R. Spiegel (2003), Theory and Problems of Probability and Statistics

   The format of the End Semester Examination will be as follows:

*   One 18-mark question from Topic I, with 4 parts of 6 marks each, student to attempt 3 out of 4 parts

*   One 18-mark question from Topic II, with 4 parts of 6 marks each, student to attempt 3 out of 4 parts;

*   Two questions from Topic III, one 15-mark question with four parts of 5 marks each, student to attempt 3 out of 4, and one 12–mark question with 3 parts of 6 marks each, student to attempt 2 out of 3; and

*   One 12-mark question from Topic IV, with 3 parts of 6 marks each, student to attempt 2 out of 3 parts.