4108

M.A. Economics (Previous) 2019-20

Basic Mathematics and Statistics for Economics

Objective: This paper is combination of basic mathematical and statistical techniques. Aim of this course is to illustrate the students the method of applying mathematical techniques to economic theory in general. In this paper is taught to the students also with the aim of imparting knowledge of various Statistical Methods (techniques) to them especially those tools are taken in detail which are frequently used in Economic Analysis.

Unit I

Differential Calculus and Integration

Simple Differential Calculus – First and Higher Order derivatives, Maxima and Minima. Partial and Total Derivatives- First and Higher Order derivatives. Application of Differential Technique: Marginal Value, Elasticity, Minimum and Maximum of Economic Functions.

Integration – Methods of Integration: Substitution, By Parts and Partial Fraction. Definite Integrals. Application of Integration: Computation of Total Functions from Marginal, Consumer's Surplus and Producer's Surplus.

Unit II

Matrix, Determinant and Advanced Mathematical Techniques

Matrix and their types, Inverse of Matrix. Determinants and their properties. Application of the Matrix and Determinants in solving Simultaneous Equations.

Input-output Model: Concept, Assumptions and Limitations.

Game theory: Saddle Point Solution, Mixed Strategy, Nash Equilibrium.

Linear Programming: Concept, Assumptions, Structure, Dual Problem and Graphical Solution.

Unit III

Descriptive Statistics

Measures of Central Tendency – Mean, Median, Mode. Measures of Dispersion – Range, Mean Deviation, Standard Deviation, Coefficient of Variation, Quartile Deviation, Skewness and Kurtosis.

Unit IV

Correlation, Regresssion and Time Series

Correlation – Meaning, Types and Degrees. Simple Correlation Coefficient: Karl Pearson and Rank Correlation Methods. Partial and Multiple Correlations: Concept.

Regression Analysis – Simple Regression: Regression Coefficients and Least Square Method. Concept of Multiple Regression

Time Series Analysis – Concept and Components; Determination of Regular trends: Moving Average Methods and Least Square Method; Seasonal Indices.

Unit V

Index Numbers and Probability Theory

Index Numbers – Concept, Assumptions, Objectives, Methods: Laspeyer's, Pasche's and Fisher, Family budget method, Problems in the Construction and Limitations of Index Numbers, Test for ideal Index Number.

Elementary Probability Theory: Concept of permutation and combination, Concept of probability, Rules of probability (addition and multiplication rules), Conditional Probability and Bayes' rule. Probability Distribution – Binomial, Poison and Normal Distribution: Properties and Uses.

Basic Reading List

1. Agrawal, D.R. (2015). Mathematics and Statistics in Economics, Vrinda Publications,Delhi.
2. Agrawal, N.P. (2015). Quantitative Techniques, RBD Publishing House, Jaipur (Hindi and English Version).
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4. Black, J. and J.F. Bradley (1973), Essential Mathematics for Economists, John Wiley and Sons.
5. Chiang, A.C. (1986). Fundamental Methods of Mathematical Economics (3rd Edition), McGraw Hill, New Delhi
6. Croxton, Crowden and Klein (1971). Applied General Statistics, Prentice Hall of India, New Delhi.
7. Gupta, S.C. (1993) – Fundamentals of Applied Statistics, S. Chand and Sons, New Delhi.
8. Gupta, S.P. (2002). Statistical Methods ,S. Chand and Sons, New Delhi.
9. Madnani, G.M.K.- Arthshastra Me Ganit Ke Prayog (Hindi Version).
10. Mehta, B.C. and Madnani, G.M.K. (2008) – Mathematics for Economists, Sultan Chand and Company, New Delhi.

11. Nagar, A.L. and Das, R.K. (1993). Basic Statistics, Oxford University Press, New Delhi.
12. Nagar, K. (2002). Fundamentals of Statistics, Meenakshi Publications, Meerut (Hindi and English Version).
13. Nathuramka L.N. (2018). Arthshastra Me Ganit Ke Prayog, College Book House, Jaipur (Hindi Version).
14. Sing S.,O.P. Singh and Y.K. Singh- Arthshastra Ganit evam Prarambhik Sankhyiki, Radha Publications, New Delhi (Hindi Version).
15. Srivastava, S.C. and Sangy Srivastava – Fundamentals of Statistics, Anmol Publications Pvt. Ltd., New Delhi.
16. Sydsaeter K.and P. Hammond (2002). Mathematics for Economic Analysis, Pearson Educational Asia, Delhi.