Core Course-IV
MA ECONOMICS (CBCSS)
I SEMESTER
ECO1 C04 - QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS I
(Credit 4)

Module I: Linear Algebra

Different types of functions and its graphs, Constant Linear, Quadratic, Cubic, Polynomial, Exponential and logarithmic functions. Applications of linear functions in Economics- Vectors and Matrices, determinants, solution of a system of equations - Inverse method and Crammer's rule- Rank of a matrix-characteristic equations and characteristic roots and vectors.

Module II: Differential Calculus

Functions, limit of a function, continuity of a function, Derivative of a function - Rules of Differentiation, Higher order derivatives, differentiation of logarithmic functions, exponential functions and implicit functions- Application of Derivatives- Meaning of a Derivative- rate of change- slope of a curve- Marginal concepts related to demand, supply, cost, revenue and production functions. Maxima and minima- Economic applications.

Module III: Functions of Several Variables

Functions of several variables - Partial differentiation- Optimisation of Multivariable functions- constrained optimization with Lagrangian multipliers-Consumers and producers equilibrium using constrained optimization Differentials- Total and Partial derivatives- Total derivatives- Rules of integration- Definite integral, area under a curve-estimation of producers and consumers surplus.

Module IV: Differential and Difference Equations

First order Differential equations -Definitions and concepts, general formula for Differential equations – Economic applications-Differential equations for limited and unlimited growth - First order Difference equations- Solution of first order difference equations - General formula for First order Linear Difference equations, applications - stability conditions, Cobb Web model.

Module V: Financial Mathematics

Arithmetic and geometric sequence and series- Simple interest, compound interest and annual percentage rates- Depreciation- Net present value and internal rate of return- Annuities, debt repayments, sinking funds- The relationship between interest rates and the price of bonds.

References

1. Essential Mathematics for Economics and Business, Teresa Bradley and Paul Patton, Revised by Teresa Bradley, Wiley Student Edition Chapter- 2 and Chapter-4.
2. Introduction to Mathematical Economics Edward T. Dowling Third Edition Chapter-8.
3. Taro Yamane: Statistics - An Introductory Analysis, Harper & Row, Edition 3.
4. Hoel PG: Introduction to Mathematical Statistics, John Wiley & Sons, Edition.
5. RGD Allen Mathematical Analysis for Economics.
6. Tulsian, P.C and Vishal Pandey: Quantitative Techniques, Pearson Education, New Delhi.
7. S.P. Gupta: Statistical Methods, Sultan Chand and Sons, New Delhi.
8. Hooda R.P. Statistics for Business and Economics, Macmillan, New Delhi.
9. Alpha C Chiang: Fundamental Methods of Mathematical Economics, 2nd Ed.

Inter National Student Edition, Mc Grawhill.
10. Edward T Dowling: Introduction to Mathematical Economics, Third Edition, Schaum's Outlines, Tata Mc Grawhill Publishing Co. Ltd, New Delhi.
11. Sreenath Baruah: Basic Mathematics and its Applications in Economics, Macmillan India Ltd.
12. Joseph K.X, Quantitative Techniques, CUCCS Ltd, Calicut University.

Core Course-VIII
MA ECONOMICS (CBCSS)
II SEMESTER
ECO2 C08 - QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS II
(Credit 5)

Module I: Probability and Probability Distributions

Concepts- Set theory- Permutations and Combinations, Definitions of Probability - classical, empirical and axiomatic approaches- Addition and multiplication laws, conditional probability- Bay's theorem, Random variables- probability distribution- Mathematical expectation- moments- Two random variables, joint, Marginal and conditional probability functions, expectation of two random variables.

Module II: Discrete and Continuous Probability Distribution

Probability Distributions - Discrete Probability Distributions, Binomial , Poisson, Uniform - simple applications-Continuous probability distributions- Normal, Lognormal and Exponential Distributions (Derivations are not expected), concept of law of large numbers and Central limit theorem.

Module III: Theory of Estimation

Statistical Inference, Concept of population, sample- Sampling distributions- Standard error- Distributions of sample mean, Sample variance - chi square Student's t, and F distributions- Small and large sample properties of Z, t, Chi Square and F- Estimations of populations parameters- point and interval estimation- Fisher's properties of estimators-Confidence interval for Mean and Proportion and variance- Methods of estimation-Methods of least squares, Method of maximum likelihood.

Module IV: Testing of Hypothesis

Parametric and Non-parametric tests of Hypothesis - Testing of hypothesis- simple and composite hypothesis- Null and alternative hypothesis- Type I and Type II error, Critical region- Level of significance, Power of a test- Test procedure - Test of significance in respect of Mean, Proportion, Variance and Correlation coefficient and their differences -Chi Square test of goodness of fit, and test for independence of attributes. Non parametric tests, sign test, Wilcoxon- Mann Whitney U Test, Signed rank test, Kruskal Wallis test, Wald-Wolfowitz test.

Module V: Analysis of Variance

Analysis of Variance- Meaning, assumptions-One way classification and Two way classifications, simple applications.

References

1. Taro Yamane, Statistics: An Introductory Analysis, Harper & Row, Edition 3, 1973
2. Hoel PG: Introduction to Mathematical Statistics, John Wiley & Sons, Edition 4, 1971
3. YP Agarwal: Statistical Methods: Concepts, Application and Computation, Sterling Publishers 1986
4. Sidney Siegal, N. John Castellan: Non parametric Statistics for Behaviour Sciences, Edition 2, 1988, Mc Graw-Hill
5. Tulsian, P.C and Vishal Pandey: Quantitative Techniques, Pearson Education, New Delhi
6. S.P. Gupta: Statistical Methods, Sulthan Chand and Sons, New Delhi.

7. Hooda R.P: Statistics for Business and Economics , Mac Million, New Delhi
8. Alpha C Chiang: Fundamental Methods of Mathematical Economics, 2nd Ed. -Inter National Student Edition, Mc Grawhill
9. Edward T Dowling: Introduction to Mathematical Economics, Third Edition, Shaum's Outlines, Tata Mc Grawhill Publishing Co. Ltd, New Delhi.
10. Sreenath Baruah: Basic Mathematics and its applications in Economics, Macmillan India Ltd.
11. Joseph K.X, Quantitative Techniques, CUCCS Ltd, Calicut University.