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UNIVERSITY OF MYSORE
(Estd.1916)

POST GRADUATE DIPLOMA
in
RESEARCH METHODOLOGY AND
QUANTITATIVE TECHNIQUES FOR
DATA ANALYSIS

Choice Based Credit System (CBCS)



UNIVERSITY OF MYSORE

DEPARTMENT OF STUDIES IN ECONOMICS AND CO-OPERATION
MANASAGANGOTRI, MYSURU-570 006

POST-GRADUATE DIPLOMA IN RESEARCH METHODOLOGY AND QUANTITATIVE TECHNIQUES FOR DATA ANALYSIS

[Syllabus: 2017-2018]

INSTRUCTIONS:

1. **Duration:** Post-Graduate Diploma in Research Methodology and Quantitative Techniques for Data Analysis is for a duration of **TWO Semesters** [i.e., ONE Year]
2. **Number of Courses:** The Programme consists of **FOUR** Courses per semester.
3. **Total Number of Courses:** Eight Courses in Total.
4. **Number of Credits:** Number of Credits for each Course shall be **FIVE**.
5. **Total Number of Credits:** 8 Courses x 4 Credits = 40 Credits
6. **Teaching Hours:** 4 Hours per week for each course. [About 60 hours for each course]
[OR 5 Hours per day x 12 Days = 60 Hours per Course if it is implemented as a short term course for faculty and Research Scholars from other Universities intend to pursue the Programme during vacation]
[This shall be inclusive of theory, application, practical work, tutorials, and seminars as required/applicable to each course depending on the content and approach by the faculty]

7. Allocation of Marks:

Total Marks: 800 Marks [400 Marks for Each Semester]

Number of Marks for Each Course: 100 Marks

Out of 100 Marks: 70 Marks is for Theory Examination [Comprehensive end Semester Exam]
30 Marks is for Internal Assessment [for all the Courses in 2 Semesters]

30 Marks for Internal Assessment shall have the break-up as follows:

20 Marks for Two Tests [@ 10 Marks for each Test per Course]

05 Marks for One Assignment [for each Course]

05 Marks for Seminar Presentation [for each Course]

8. **Statistical Software for Data Analysis*** offered in the II-Semester is Practical Lab Oriented.
 - Practical Examination relating to Statistical Software for Data Analysis shall be for 70 Marks. 30 Marks shall be for Internal Assessment.
 - A Supportive Course on *Fundamentals of Computers* is essential for the students to pursue the Core Course on *Statistical Software for Data Analysis* in II-Semester.
9. **Fees Structure:**
 - Post-Graduate Diploma in Research Methodology and Quantitative Techniques for Data Analysis is a fully Self-Finance Programme. [Fee shall be Prescribed in the Prospectus Copy]
 - There shall be an additional fee component for the Course on *Statistical Software for Data Analysis* and a supportive Course on *Fundamentals of Computers* since there is no Computer Lab Facility in the Department and hence it needs to be offered either in the Center for Information Science and Technology [CIST] or Computer Center of the University.
 - The fee collected by the University shall be inclusive of the supportive course on *Fundamentals of Computers*, which shall be offered preferably during I Semester.
 - Fees to be collected from the students [by the University] at the time of admission shall be included in the Fee Structure of the University.

CHAIRMAN
Department of Studies
Economics and Co-operation
University of Mysore
Manasagangothri
MYSORE-570 006

10. Project Work**

- Project Work shall be for 70 Marks.
- Topic for the Project Work can be selected by the Students or suggested by the Faculty at the beginning of the First Semester.
- The Project Work will have to be submitted by the Students to the Department before the end of the II-Semester [i.e., on or before the last working day of the Semester].

11. Viva-Voce Exam:

- **Viva-Voce Exam** shall be for 30 Marks [On the Project Work done by the Students]
- Viva-Voce Examination shall be conducted in Department of Studies in Economics & Cooperation within a week or two after the completion of the second semester examination.
- Viva-Voce Committee shall comprise of: (i) The Chairperson, (ii) Concerned Supervisor of the Project, and (iii) Three other faculty members from the Department.
- One External Examiner from other universities within Karnataka [as decided by the Department Council] shall be invited for conducting of Viva-Voce Examination.
- Viva-Voce Examination shall be open to all the students of the concerned batch.
- Marks for the Viva-Voce Exam shall be the average of marks given by all the examiners.
- Consolidated Marks List [consisting of the marks given by each examiner] shall be sent to the University preferably on the same day or immediate next working day.

12. Eligibility Criteria:

- Students who have completed their Bachelor's Degree with Economics as one of the Cognate Subjects, B.Sc., with Mathematics or Statistics as one of the Cognate Subjects in Bachelor's Programme, B.Com, BBM and Students with Masters' Degree in Social Science, Commerce & Management are eligible to pursue this Course.

COURSE STRUCTURE**I-SEMESTER**

Course No.	Course Code	Title of the Course	No. of Credits	Marks for Theory	Internal Assessment	Total Marks
1	I-HC: 1	Basic Mathematics	5	70	30	100
2	I-HC: 2	Basic Statistics	5	70	30	100
3	I-HC: 3	Research Methodology	5	70	30	100
4	I-SC: 3	Computer Basics	5	70	30	100
TOTAL			20	280	120	400

II-SEMESTER

Course No.	Course Code	Title of the Course	No. of Credits	Marks for Theory	Internal Assessment	Total Marks
1	II-HC: 1	Theory of Econometrics	5	70	30	100
2	II-HC: 2	Applied Econometrics	5	70	30	100
3	II-SC: 3	Statistical Software for Data Analysis	5	70	30	100
4	II-SC: 4	Project Work	5	70	30	100
TOTAL			20	280	120	400



**POST-GRADUATE DIPLOMA IN RESEARCH METHODOLOGY AND
QUANTITATIVE TECHNIQUES FOR DATA ANALYSIS**

I - SEMESTER Course No: 1 (Hard Core)

Course Code: (I-HC:1) BASIC MATHEMATICS

Preamble: Economics is incomplete without knowledge of mathematics, since mathematics gives flesh and blood to the subject of Economics. Mathematics for Economics deals with various applications of mathematical tools and techniques in defining and developing economic relationships. So this course, accordingly, is designed to include various mathematical methods to analyze and understand economic theories.

Module - 1: Basic Mathematics for Economic Analysis

Relationship between Mathematics and Economics - Applications of Mathematics in Economic Analysis - Its Uses and Limitations - Logic, Sets and Relations - Functions - Meaning and Types: Linear and Non-Linear, Power, Exponential and Logarithm - Analytical Geometry - Simultaneous Equations - Solutions for Two Variables Application to Market Equilibrium: Derivation of Demand and Supply Functions - Marshal and Walras' Stability Conditions - Effect of Taxes and Subsidies, Indifference Curves, National Income, Interest: Compounding and Discounting, Changes in Aggregate Demand and Supply Functions, Consumption Function.

Module - 2: Elementary Matrix Algebra

Basic Concepts - Types of Matrix - Matrix Operations - Transpose - Inverse Matrix - Determinants: Meaning, Properties, Rank of Matrix, Minor, Co-factor.
Functions of Several Variables - Cramer's Rule and its Applications in Economics.

Module - 3: Differential and Integral Calculus

Differential Calculus: Limits - Derivations - Rules of Differentiation - Partial Derivatives, Total Derivatives, - Maxima and Minima for One and Two Variables.

Applications to Economic Analysis:

Consumers Behavior: Elasticity of Demand, Relationship between Price Elasticity and TR, AR and MR, Consumers' Equilibrium and Utility Maximization

Firm's Behaviour: Production Function - Cost Function - Revenue Function - Equilibrium of Firm and its Profit Maximization - Homogenous Function - Cobb-Douglas Production Function - CES Production Function - Euler's Theorem - Monopoly and Joint Production - Duopoly, Monopolistic Competition and Oligopoly.

Integral Calculus: Techniques of Integration - Definite and Indefinite Integration.

Applications to Economic Analysis: Consumer's Surplus - Producer's Surplus.

Introduction to Frontier Analysis: Technical Efficiency - Technological Change and Total Productivity - Multi-Market Equilibrium.

Module - 4: Difference and Differential Equations

Difference Equations: Definitions and Concepts - Solutions to First Order and Second Order Difference Equations.

Applications to Economics: Cob-web Model.

Differential Equations: Definitions and Concepts - Solutions to First Order and Second Order Differential Equations.

Applications to Economics: Harrod-Domar Model, Multiplier and Accelerator.

Module - 5: Linear Programming and Input-Output Analysis

Linear Programming: Basic Concepts - Constrained Optimization - Formulation of Linear Programming Problem - Nature of Feasible and Optimal Solutions - Solution through Graphical Methods - Introduction to Simplex method - Duality Theorem.

Input-Output Analysis: Basic Concepts, Static, Open and Closed Input-Output Models

References: [Please refer to the Latest Editions]

1. Allen R.G.D., *Mathematical Analysis for Economists*, Macmillan.
2. Bose D., *An Introduction of Mathematical Economics*, Himalaya Publishing House, Mumbai.
3. Chiang A.C., *Fundamental Methods of Mathematical Economics*, McGraw-Hill Higher Education.
4. Veerachami R., *Quantitative Methods for Economists*, New Age International Pub., New Delhi
5. Yamane Taro, *Mathematics for Economists - An Implementer Analysis*, Phi Learning Publishers.



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I - SEMESTER Course No: 2 (Hard Core)

Course Code: (I-HC: 2) BASIC STATISTICS

Preamble: Economics has become more and more analytic over the years, requiring sufficient knowledge of quantitative methods. To meet this requirement, a course in Statistics for Economics is absolutely essential. This course will help the student in data collection, presentation, analyses and drawing inferences about various statistical hypotheses. Further, it helps to develop the analytical skills in the student.

Module - 1: Introduction to Statistics

Types of Data - Nominal, Ordinal & Ratio-Scale Data, Qualitative and Quantitative Data, Individual, Discrete and Continuous Data - Cross Section, Time Series and Pooled Data - Sources of Data - Population and Samples - Descriptive Statistics and Inferential Statistics.

Module - 2: Measures of Average and Dispersion

Measurement of Average - Arithmetic Mean, Weighted Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, Quartile, Percentiles, and Mode.
Measures of Variability - Range, Inter-quartile Range, Quartile Deviation, Percentiles Deviation - Mean Deviation, Standard Deviation, and Coefficient Variation.

Module - 3: Probability and Distribution

Probability Theory - Concepts and Approaches to Estimate Probability - Probability Distribution Functions - Theoretical Distribution: Normal, t, Chi-Square & F Distribution.

Module - 4: Theory of Estimation and Hypothesis Testing

Concept of Estimator - Sampling Distribution of Estimator - Point and Interval Estimation - Properties of Good Estimator for Small and Large Samples.
Hypothesis Testing: Approaches to Hypothesis Testing - Confidence Interval Approach - Test of Significance Approach and P-Value Approach - Formulation of Hypothesis - Null and Alternative - Level of Significance - One Sided and Two Sided Hypothesis - Type-I and Type-II Error - Test Statistic - Critical Value - Parametric and Non-Parametric Tests.

Module - 5: Correlation and Regression

Correlation: Meaning and Types of Correlation - Measurement of Correlation - Scatter Diagram - Karl Pearson's Coefficient of Correlation - Spearman's Rank Correlation - Testing of Correlation Coefficients.

Regression: Simple Regression Model - Estimation - Least Squares Method - Goodness of Fit - Introduction to Multiple Regression.

Module - 5: Time Series Analysis

Nature and Decomposition of Time Series - Analysis of Trend - Polynomial Trend - Moving Average Method, Exponential Smoothing, Least-Square Method, Seasonal Component - Forecasts and their Accuracy - Root Mean Square Error.

Module - 6: Index Numbers

Nature and Purpose of Index Numbers - Types of Index Numbers: Price Index - Retail Price Index - Quantity Index, Link and Chain Index - Simple and Aggregate Index Numbers: Laspeyre's Index, Paasche's Index, Marshall and Edgeworth's Index - Fisher's Index - Time Reversal and Factor Reversal Tests - Deflation and Splicing of Index Numbers - Problems of Construction of Index Numbers - Limitation of Index Numbers.

Practical Component:

Graphical Presentation of Data: Tabular and Graphical Methods - Relative Frequency and Percentage - Frequency Distribution - Bar Graphs, Line Graph, Pie Charts, Histogram, Cumulative Distribution and Ogives.

References: [Please refer to the Latest Editions]

1. Anderson, Sweeney & Williams, *Statistics for Business & Economics*, Thomson South-Western, Bangalore.
2. Gupta S P. *Statistical Methods*, S. Chand and Company, New Delhi.
3. Veerachami R. *Quantitative Methods for Economists*, New Age International Pub., New Delhi.
4. Yamane Toro, *Statistics - An Introductory Analysis*, Harper and Row Publishers, New York.



**POST-GRADUATE DIPLOMA IN RESEARCH METHODOLOGY AND
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I - SEMESTER Course No: 3 (Hard Core)

Course Code: (I-HC: 3)

RESEARCH METHODOLOGY

Preamble: Research as defined in Webster's 'new international dictionary' consists of "careful or critical inquiry or examination in seeking facts or principles; diligent investigation in order to ascertain something". This emphasis of the fact that - research in its broader sense is a purposive investigation or inquiry. The main purpose of research is to describe, interpret and explain phenomena by relating it to other phenomena, thereby setting it within its proper context and by making its meaning or sense explicit through its chain of interconnections. This Course will give a thorough insight to acquire research skills and capabilities.

Module - 1: Introduction to Research Process

What is Research? - Meaning and Characteristics - Types of Research - Methods - Planning a Research - Identification of Research Problem - Defining the Research Problem - Theoretical Foundation - Review of Literature - Objectives - Hypotheses - Difference between a Proposition, a Hypothesis and a Theory - Data Source - Sampling - Scope - Methodology - Logic of Inquiry - Research Design - Reference and Documentation in the Library - Need and Importance of Research in Economics - Applicability - Plagiarism - Limitations and Ethical Issues in Research.

Module - 2: Types and Methods of Research

Classification of Research: Pure and Applied Research - Qualitative, Quantitative and Mixed - Exploratory, Descriptive, Diagnostic, Evaluation, Action and Experimental Research - Historical Research - Surveys - Case Study - Field Study - Steps in Research.

Module - 3: Data Sources and Methods of Data Collection

Sources of Data: Primary and Secondary Sources of Data - Quantitative Data: Availability of Sources - Time Series Data - Cross Section Data and Pooled Data - Census, Reports and Documents, other Published and Unpublished Sources.

Qualitative Methods of Data Collection: Direct Observation - Indirect Observation: Interview Method, Schedules and Questionnaires - Questionnaire Designing Procedure - Case Study, Projective Methods - Simulation - Merits & Demerits.

Module - 4: Sampling Considerations and Data Processing

Sampling Considerations: Concepts - Sample v/s Census - Principles of Sampling Design & Process - Types of Sample Design: Probability Sampling Techniques: Simple Random, Stratified Random, Cluster and Multi-Stage and other Methods of Sampling. Non-Probability Sampling Techniques: Quota Sampling, Convenient Sampling, Purposive Sampling, Judgment Sampling and other Methods - Determination of Sample Size - Advantages and Disadvantages - Errors in Sampling.

Data Processing: Processing and Distribution - Field Work Validation - Tabulation - Editing - Coding - Classification and Tabulation of Data - Presentation - Graphical Representation.



Module - 5: Data Analysis and Interpretation (Theoretical Exposure)

Univariate and Multivariate Data Analysis - Descriptive vs Inferential Analysis - Descriptive Analysis of Univariate Data and Bivariate Data - Testing of Hypotheses: Concepts, Steps in Testing of Hypothesis.

Estimation of Mean: Test of Single Sample Mean - Two Independent Means Tests - Testing for Means of Paired Data - Testing for the Equality of K Population Means - Assumptions for Analysis of Variance - Between Treatments Estimate of Population Variance - Within Treatments Estimate of Population Variance - Comparing the Variance of Estimates - The F Test - Multiple Comparison Procedures.

Estimation of Variance: Test of Single Sample Variance - Two Sample Variance Test.

Non-Parametric Tests: Advantages & Disadvantages - Chi-square tests - Tests for Randomness.

Introduction to Advanced Data Analysis Techniques: Correlation and Regression Analysis - Factor Analysis - Discriminant Analysis - Cluster Analysis - Multidimensional Scaling.

Module - 6: Report Writing and Presentation of Results

Importance of Report Writing - Types of Reports: Brief Reports, Detailed Reports, Technical Reports and Business Reports - Report Preparation - Report Structure: Preliminary Section, Main Report - Interpretations of Results - Research Findings and Suggested Recommendations - Limitations of the Study, and End Notes - Report Writing: Report Formulation - Effective Documentation: Need and Guidelines: Presenting Tabular Data, Visual Representations: Tables, Graphs, Charts - Presenting Footnotes and Bibliography - Oral Presentation of Research.

References: [Please refer to the Latest Editions]

1. Bryman Alan, *Social Research Methods*, Oxford University Press, Oxford.
2. Kothari C.R., *Research Methodology*, New Age International Publication, New Delhi.
3. Krishnawamy O.R. and Ranghanathan, M., *Methodology of Research in Social Sciences*, Himalaya Publishing House, Bangalore.
4. Kurian C.T. *Research Methodology in Economics*, Institute of Development Studies, Madras.
5. Majumdar P.K., *Research Methods in Social Science*, Viva Books Private Limited, New Delhi.
6. Robert, A. Day, *How to Write and Publish a Scientific Paper*, Cambridge University Press, Great Britain.

**POST-GRADUATE DIPLOMA IN RESEARCH METHODOLOGY AND
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I - SEMESTER Course No: 4 (Soft Core)

Course Code: (I-SC: 4) COMPUTER BASICS

[A SUPPORTIVE COURSE TO STATISTICAL SOFTWARE FOR DATA ANALYSIS]

Module - 1: Introduction to Digital Computers

Historical Perspective of Computer Development - Generation of Computers - System Logical Organization - Number Systems: Binary, Octal, Hexadecimal.

Module - 2: Computer Hardware

Fundamentals of Computers - Organization and Components of Computers - Computer Hardware - Input Devices: Keyboard, Mouse, and VDU - Output Devices: Printers (various types), Plotter and Monitor, Scanner, Digitizer etc., - Secondary Storage Devices: Floppy Disk, Hard Disk and CD ROM - Specification of peripherals and Computers.

Module - 3: Computer Software

Different Types of Software, Translator and Compilers - Application Software - Algorithms and Flow Chart - Programming Language - Errors - Types - Introduction Operating System and Utilities.

Module - 4: Computing Environment

Types of Computers: Micro Computers, Mini Computers, Main Frame Computers, Desk Top Computers, Note Book Computers and Work Stations - Computer Networks - Brief Introduction to LAN, WAN and Internet.

Module - 5: Office Automation

Various Types of Operating System - MS DOS, Basic Commands - Windows 1998 and 2000 - Introduction - Working with Windows - Copying, Creating, Deleting Files and Folders in Windows - Introduction to Window Application - Programme - MS Office - Word, Excel and Power Point - Information Integrity Ensuring Integrity - Computer Security - Preventive Measures and Treatment.

Module - 6: Data Processing and Data Management

Inputting Data from the Keyboard - Creating File in Microsoft Excel - Loading of existing Data Set - Inputting Data from Raw Data File - Copying Data from Microsoft Excel to Clipboard - Adding Two Sheets/Files, Editing Files - Printing, Saving and Copying Edited Files.

Module - 7: File Processing

File Processing - Sorting - Searching - Merging - Summarizing - Direct Access - Storage - Retrieval - File Organization Techniques - Documentation Debugging Storage and Time Execution Estimation - System Security.

Module - 8: Internet

Introduction to Internet - World Wide Web - Electronic Mail - Browsing the Web - Utilities - Tools and Techniques - Introduction to e-Commerce - e-payment-e-security- e-Governance - e-economics.

References: [Please refer to the Latest Editions]

1. Reader's Digest, *How to Do Just Anything on a Computer*, London.
2. Saxena Sanjay, *A First Course in Computers*, Vikas Pub., House Private Ltd, New Delhi.



**POST-GRADUATE DIPLOMA IN RESEARCH METHODOLOGY AND
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II - SEMESTER Course No: 1 (Hard Core)

Course Code: (II-HC: 1) THEORY OF ECONOMETRICS

Preamble: The explosive growth in econometric literature in the last few decades hardly needs any emphasis. Introduction of this Course can be viewed as an attempt to expose the students to the basic concepts of econometrics. Keeping this in mind, the focus of this Course will be on a meaningful interface between theory and application - the emphasis being more on empirical analysis rather than theoretical rigour.

Module - 1: Introduction to Econometrics

Meaning - Nature and Scope of Econometrics - Distinction between Economics and Econometrics, Mathematics and Econometrics, Statistics and Econometrics - Methodology of Econometrics - Types of Econometrics.

Module - 2: Simple and Multiple Regression Model

Simple Regression: Meaning - Basic Ideas - Significance of Disturbance Term. Method of Estimation: Ordinary Least Squares and Maximum Likelihood Estimation - BLUE Property - Coefficient of Determination - Assumptions - Hypothesis Testing - Confidence Interval and Test of Significance Approach - Testing Regression Coefficients - Interpretation of Results.

Multiple Regression: Meaning - Three Variable Regression Model - Partial Regression Coefficients - Method of Estimation - R-Square and Adjusted R-Square - Hypothesis Testing - Testing Individual Regression Coefficient - Overall Significance Test - ANOVA.
Introduction to Matrix Approach to Estimation of Parameters of more than Three Variables.

Module - 3: Practical Problems of Regression

Multicollinearity: Nature - Causes -Consequences - Detection - Remedial Measures.
Heteroscedasticity: Nature - Causes -Consequences - Detection - Remedial Measures.
Auto-Correlation: Nature - Causes -Consequences - Detection - Remedial Measures.

Module - 4: Dummy Variable and Dynamic Regression Models

Dummy Variable Model: Meaning - Nature - Dummy Variable Trap - Dummy Variable Model with Single Qualitative Variable - Two Qualitative Variables - Dummy Variable Model with Mixture of Qualitative and Quantitative Variables.

Autoregressive and Dynamic Models: Role of Lag in Economics - Estimation Methods: Koyck's; Adaptive Adjustment and Partial Expectation Models - Almon Approach to Distributed Lag Models.

Module - 5: Simultaneous Equation Models

Nature - Simultaneous Equation Bias - Identification: Under - Exact - Over Identification - Rules of Identification - Order and Rank Condition of Identification - Estimation of Simultaneous Equations Models: ILS, 2SLS, 3SLS, LIMLE, FIMLE.

References: [Please refer to the Latest Editions]

1. Damodar N Gujarati, *Basic Econometrics*, McGraw Hill, International Student Edition.
2. Damodar N Gujarati, *Econometrics by Example*, Palgrave Macmillan, United Kingdom.
3. Ghosh Sukesh K, *Econometrics- Theory and Applications*, Prentice Hall Private Ltd., New Delhi.
4. Koutsoyiannis A., *Theory of Econometrics*, The Macmillan Press Ltd., London.



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II - SEMESTER Course No: 2 (Core Course)

Course Code: (II-HC: 2) APPLIED ECONOMETRICS

Preamble: This course covers the statistical foundations of econometric theory as well as econometric methods and applications. The focus of this course will be therefore on an interface between these three facets that are essential for a proper understanding of econometric applications in economic analysis.

Module - 1: Qualitative Dependent Variable Models

Nature of Qualitative Variables - Linear Probability Model - Logit Model - Probit Model - Tobit Model for Grouped and Ungrouped Data - Their Application in Economics.

Module - 2: Time Series Econometrics

Introduction - Stationary and Non-Stationary Series - Random Walk Model - Testing of Unit Root - Co-integration - Test for Co-integration - Engel-Granger Test - Johansen Test - Error Correction Model - Introduction to ARCH and GARCH Modeling - Their Application in Economics.

Module - 3: Panel Data Models

Why Panel Data? - Estimation - Fixed Effects Method - All Coefficient Constant across Time and Individuals - Slope Coefficients Constant but Intercept Varies across Individuals - Slope Coefficients Constant but Intercept Varies Over Individuals as Well as Time - All Coefficients Vary across Individuals - Random Effects Method - Fixed Effects v/s Random Effects Model - Hausman Test - Their Application in Economics.

Module - 4: Empirical Demand, Production and Investment Analysis

Static Single Equations - Demand Analysis - Theoretical Foundations of Demand Analysis - Utility Theory - Tobin's Study- Static Multiple Equations - Production Function - Neoclassical Production Function - Cobb-Douglas Production Function - CES Production Function - Dynamic Single Equation Model - Investment Behaviour Models - Meyer and Kuh Model - Kuh Model

Module - 5: Econometric Applications in India

Econometric Applications in Indian Demand Analysis - Indian Agriculture - Indian Industry - International Trade.

References: [Please refer to the Latest Editions]

1. Brooks Chris, *Introductory Econometrics for Finance*, Cambridge University Press, Cambridge.
2. Desai Meghnad, *Applied Econometrics*, McGraw Hill Publishing Company Ltd.
3. Gujarathi Damodar, *Basic Econometrics*, McGraw Hill, International Student Edition.
4. Krishna K. L., *Indian Econometrics Models*, Oxford University Press, Oxford.
5. Patterson Kerry, *An Introduction to Applied Econometrics a Time Series Approach*, Macmillan Press.



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II - SEMESTER Course No: 3 (Supportive Course)

Course Code: (II-SC: 3) STATISTICAL SOFTWARE FOR DATA ANALYSIS

Preamble: In the era of information technology proper use of information technology in most of the disciplines has become a necessity. Economics being an empirical science, computer has emerged as the pivotal instrument for economic analysis, research and forecasting. Given the highly quantitative aspect of research in economics, it becomes imperative for students to equip themselves with a basic knowledge of statistical software if they are to keep abreast of the explosive growth of knowledge in the rapidly growing area. This is essential for anyone intending to specialize in applied economics, as statistical software are the only interface between data and their meaningful analysis (especially if the data collection is done at a substantially sophisticated level). Therefore the students of economics need to be equipped with skills and tools based on statistical software. This will not only enhance their employability but also prepare them for future challenges. This course is basically tailored to meet this current lacuna in the research in applied economics.

Module - 1: Introduction - Getting Started - Entering Data in the Data Viewer - Defining Variables - Recoding Variables - Computing new Variables - Data Analysis with Statistical Software - Generating Frequency Table, Bar Chart, Pie Chart, Histogram, Arithmetic Mean, Median, Standard Deviation and Range, Contingency Table, Chi-square, and Cramer's V, Pearson's r , and Spearman's rho, Scatter Diagrams - Saving, Retrieving Data - Printing Output.

Module - 2: Matrix and Determinants Operations - Computing Inverse Matrix, Input-Output Analysis - Construction of Different Tables - Transaction Matrix, Technical Coefficient Matrix, Computation of Values on the Basis of Problems.

Module- 3: Computing, Discounting and Calculation of Present Value - Linear Programming - Procedure used in Formulating and Solving Linear Programming Problems- Graphical and Simplex Methods, Profit Maximization and Cost Minimization.

Module - 4: Construction of Frequency - Generating Graphs - Histogram, Pie Charts, Bar - Graphs, Calculation of Probability, Calculation of Central Tendencies and Measures of Dispersion.

Module - 5: Estimation Correlation Coefficient - Zero Correlation Matrix - Partial Correlation - Estimation of Simple Regression - Ordinary Least Squares - Estimation of Multiple Regression.

Module - 6: Test of Statistical Significance - 't' Test - F Test - ANOVA Test - Chi-Square Test Construction of Index Numbers - Deflating a Series by Price Indexes - Time Series Analysis and Forecasting.

References: [Please refer to the Latest Editions]

1. Bryman Alan, *Social Research Methods*, Oxford University Press, Oxford.
2. Edward Minieka, *Statistics for Business with Computer Application*, South-Western, USA
3. Sonia Taylor, *Business Statistics*, Palgrave.



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II - SEMESTER

Course No: 4 (Supportive Course)

Course Code: (II-SC: 4)

PROJECT WORK

13. Project Work**

14. Project Work shall be for 70 Marks.
15. Topic for the Project Work can be selected by the Students or suggested by the Faculty at the beginning of the First Semester.
16. Two copies of the Project Work will have to be submitted by the Students to the Department before the end of the II-Semester [i.e., on or before the last working day of the Semester].

17. Viva-Voce Exam:

18. **Viva-Voce Exam** shall be for 30 Marks [On the Project Work done by the Students]
19. Viva-Voce Examination shall be conducted in Department of Studies in Economics & Cooperation within a week or two after the completion of the second semester examination.
20. Viva-Voce Committee shall comprise of: (i) The Chairperson, (ii) Concerned Supervisor of the Project, and (iii) Three other faculty members from the Department.
21. One External Examiner from other universities within Karnataka [as decided by the Department Council] shall be invited for conducting of Viva-Voce Examination.
22. Viva-Voce Examination shall be open to all the students of the concerned batch.
23. Marks for the Viva-Voce Exam shall be the average of marks given by all the examiners.
24. Consolidated Marks List [consisting of the marks given by each examiner] shall be sent to the University preferably on the same day or immediate next working day.

