Courses that Deal with the Experimental and Problem Solving Methodologies in UG & PG Programmes in Economics

UNDER GRADUATE

Course No. ECONA203
Course title: Statistical Methods – I
Nature of Course: SEC – 1
Number of credits: 4 (3+1)

Course Description: This course introduces the student to collection and presentation of data. It also discusses how data can be summarized and analyzed for drawing statistical inferences. The students will be introduced to important data sources that are available and will also be trained in the use of free statistical software to analyzed data.

Unit	Title
Unit I	**INTRODUCTION TO STATISTICS** Statistics: Meaning, Scope, Nature, Function, Importance and Limitations of statistics. Types of Data: Primary and Secondary data, Univariate and Bivariate data, qualitative and quantitative data; nominal and ordinal data, Cross-section and Time Series. Sources of data: Primary and Secondary data. Diagrammatic and Graphic Presentation of Data
Unit II	. **CENSUS AND SAMPLE** Collection of Statistical Data: Census and sample Method, Merits and demerits of census and sampling. Some basic sampling methods: Probability and Non Probability Sampling Methods with merits and demerits. Essentials of sampling, Methods of Selecting Sample, Sampling and Non- Sampling Errors.
Unit III	**MEASURES OF CENTRAL TENDENCY** Objectives of Averaging, Requisites of a Good Average. Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean. Quartiles, Deciles, Percentiles and Limitations of Averages.
Unit IV	**. DISPERSION** Meaning and significance of dispersion. Measures of dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation, Coefficient of Variation, Variance, Absolute and Relative measures of variation - Lorenz Curve

BA 2nd Year
Course No. ECONA205
Course title: Statistical Methods – II
Nature of Course: SEC – 3
Number of credits: 4

Unit	Title
Unit I	**CORRELATION ANALYSIS** Meaning, Significance of the Study of Correlation. Correlation and Causation. Types of Correlation: Positive, Negative, Partial, Multiple, Linear and Non-Linear. Methods of Studying Correlation: Scatter Diagram Method, Graphic Method, Karl Pearson‟s Coefficient of Correlation, Spearman‟s Rank Correlation. Properties and Interpretation of Correlation Coefficient.
Unit II	**REGRESSION ANALYSIS** Meaning - Difference between Correlation and Regression - Regression Lines - Regression Equations of X on Y and Y on X Only - Regression Coefficients. Elementary application of regression in demand, supply, consumption and investment functions.
Unit III	**ANALYSIS OF TIME SERIES** Meaning and Importance of Time Series. Components of Time series, Measurement of Trend: Graphic Method, Semi, Average method, Moving Average Method, Least Square Method. Applications in Economics.
Unit IV	**INDEX NUMBERS** Meaning, Characteristics, Importance and Uses, Classification. Types of Index Numbers: Price, Quantity and Value Index Numbers. Special Purpose Indices: Cost of Living Index, Wholesale Price Index, Consumer Price Index. Problems in construction of Index Numbers.

BA 3rd Year
Course No. ECONA309
Course title: Research Methodology
Nature of Course: SEC – 5
Number of credits: 4

Unit	Title
Unit I	Introduction to Research Methodology Research: concept, meaning, significance, types, approaches; Criteria of good research; Research problem: selection, need, techniques involved; Reviewing and reporting Literature, Research Design: Meaning, need and Types. Data Collection Techniques: Questionnaire Method: Types, Format and Pre-Testing of Questionnaires. Techniques for Increasing Response of Respondents. Interview Method: Types, Process and Rules of Interviews. Factors affecting interview. Interviewer's Bias. Selection and Training of Interviewers. Observation Method: Types of Observations.
Unit II	Measurement and Scaling Techniques Measurement Scales: Different types of scales - nominal, ordinal, ratio and interval. Accuracy of Measurement and Testing of Reliability. Increasing Reliability. Sampling Techniques: Probability Vs Non–probability sampling methods (Merits, Demerits and Applications).
Unit III	Testing of Hypotheses: Hypothesis: Meaning, and formulation. Types of hypothesis – Procedure for testing hypothesis -Type-I and Type-II errors. One tail, 2-tail test. Parametric Tests: Applications of t, z, and F-test Statistics. Non-Parametric Tests: Application of Chi-Square.
Unit IV	Data Preparation, Analysis and Report Writing Process of data analysis - Editing, coding, tabulation, diagrams. Use of computers: coding, data tabulation and graphic presentation of the data. Report writing: Significance of report writing. Different steps in writing the report - Mechanics of writing a research report. Ethics in research. Presentation of Research Report.

B A 3rd ECONA 312
Project Work (SEC-8)
Credits =4

Course Description: Project Work is one of the culmination point of the learning process, which will put to test the acquired ability of the candidate to independently take the charge of the project and use the understanding of economics developed in previous years to evaluate/analyze economic issues.

Course Outline

The project must relate to economic issues/problems. The Project report shall consist of following components:
The Project will involve an extended, independent investigation of a topic and preparation of a dissertation. The chosen research area must be of a nature that incorporates an in depth exploration of economic concepts, theories and issues so as to produce a rigorous dissertation. Primary data based projects are encouraged.

Dissertations that comprise purely descriptive material will not be acceptable.

The project report must contain between 50-60 A4 size pages printed on both sides. Font must be "Times New Roman", font size 16 (heading), 14 (Sub-Headings) and 12 (text). Line spacing 1.5 inches, page indent Left 1.5 inches, Right, Top and Bottom 1 inch. Note: Font size of tables may vary as per requirement.

Structure of the Project Report
Structure is important because it dictates the topics discussed and the order in which they are organized. An ideal Project Report should comprise the following sequence:

1. Cover Page 2. Title Page 3. Acknowledgements 4. Table of Contents 5. List of Tables & 6. LIST OF Figures/Illustrations 7. Abbreviations (if any) 8. Abstract 9. Introduction	10. Review of literature 11. Research Design/ Methodology 12. Results and Analysis 13. Discussion of implications 14. Conclusions and/or Recommendations for further study 15. References 16. Appendices (if any)

Evaluation of the project (for 70% marks) will be done by external examiner based on project report and presentation along with continuous evaluation by internal examiner for (30% marks).

NOTE: The 70:30 marking ratio shall be as follows: 30 marks for Internal assessment and remaining 70 marks (EYE) to be distributed as 50 marks for Dissertation + 20 marks for Viva Voce. Therefore 30 + (50 +

20) = 100 marks. For ICDEOL students there shall be no internal assessment and the marks secured out of 70 will be rationalized using the multiplier as will be done for other theory papers (refer to course evaluation mentioned in the section titled COURSE EVALUATION above).

POST GRADUATE

DSC Course Code: MEC-12
ELEMENTARY MATHEMATICS FOR ECONOMICS
Course Credits: 5

Unit –I
MATRICES AND DETERMINANTS

Their properties, addition, subtraction, and multiplication of matrices. Transpose of a Matrix. Some special forms of square matrices-Trace, Idempotent matrix, Sub-matrix of a matrix. Inverse of a matrix and solution of equations using both the inverse of a matrix and Cramer's rule. Rank of a Matrix (Numericals relating to inverse of a matrix and Cramer's rule should to be confined to matrix of order 3x3).

Unit-II
DIFFERENTIATION

Derivatives: differentiations of functions of a single variable. Derivative of a composite function, Parametric function, logarithmic function, Exponential, and inverse functions. Concave and convex functions. Derivative of higher order. Partial Derivatives and total derivative Homogenous functions and Euler's Theorem. Maxima and Minima of functions of single variable. Profit maximization and cost minimization. Constrained optimization of function with two variables. Constrained utility maximization, constrained minimization, and the interpretation of the Lagrange multiplier.

Unit –III

DIFFERENTIAL AND DIFFERENCE EQUATIONS

Introduction, non-linear and linear differential equations of the first order and first degree. Solutions of differential equations when variables are separable, homogenous equations and non-homogenous equations, exact differential equations and linear equations. Solution of linear differential equations of second with constant coefficient. Finite difference, difference equations. Solutions of homogeneous linear difference equation with constant coefficients, linear first-order difference equations, Linear second order difference equations with constant coefficients. 14 Application of differential and difference equations in economic models (dynamics of market price, Solow growth model, cob-web model, multiplieraccelerator interaction model, Domar growth model).

Unit –IV

ANALYTIC GEOMETRY

Introduction of a Straight Line, section formula, the gradient of a straight in, the equation of a straight line in intercept form, two-point form. Circle: The general equation of a circle, Parabola: equation of a parabola, the points of intersection of line and a parabola. Equation of a rectangular

hyperbola. Problems based on applications of analytic geometry in economics. Integration of function of one variable by parts and substitution. Integration of logarithmic and exponential functions. Definite integral and area between two curves. Simple applications of integration to the relationship between marginal functions and total functions, Consumer's surplus and producer's surplus. Investment and capital formation and the present value of a continuous flow.

Unit-V
THE INPUT-OUTPUT MODEL

Its assumptions, technological coefficient matrix, closed and open input –output model, the Hawkins-Simon conditions. Solving the input-output models both open and closed using the inverse matrix. An Introduction to Linear Programming, Linear equations, slack variables. Feasible and basic solutions. Degeneracy. Solving the primal and Dual with simplex method. Interpretation of the linear programming results.

MA Economics

M.A.1st Sem. – ECONOMICS (CBCS)
Title of the Course: Data Management and Presentation Using Microsoft Excel
AECC-I/MEA-15

Unit	Details
1	Opening of Excel File-Workbook and worksheet Rename of the workbook and worksheet. Brief history of Excel workbook Advantages and disadvantages of the use of excel for statistical analysis. Location of heading/title bar- menu bar, tool bar- Formulae and function- formula space cell-cell formatting- data entry-data clearing-copy-cut-paste, paste special – paste value-paste formula-paste transpose of the data set.
2	Data transformation: arithmetic operation- addition, subtraction, multiplication, log transformation, exponential, squaring and square root, indices. Use of 'If' function- nested if, sum, sum if, count, countifcountifs, average if, text to numeric and numeric to text using if function, max, min, large value of the data set, concatenate. Sort - ascending and descending, A-Z, sort row wise /column wise. Filter of the data set and create sub sample- filter according to text filter data according to numeric values or conditions, saving the filtered data in separate worksheet. Lookup functions. Descriptive Statistics: (i) Univariate Data: Measures of Central Tendency: mean, median, mode, Trim mean, geometric mean, harmonic mean, Measures of Dispersion: Range, quartile deviation, SD, CV, Gini coefficient, Moments and Order statistics: skewness, kurtosis, rank and percentile (ii) Multivariate Data: Covariance and correlation matrix, partial correlation, rank correlation. Graphical Presentation of Data: Different types of charts and their applications, Scatter diagram and Curve fitting

M.A. 2nd Sem. – ECONOMICS (CBCS)
Title of the Course: Basic Statistics
DSC/MEC-22

Topic	Details
Measure of Central Tendency, Correlation, Regression	, Dispersion, Skewness and Kurtosis. Correlation; Meaning and methods of measuring correlation, Karl Pearson's method, Spearman's Rank Correlation coefficient, Limitations of Correlation analysis. Linear Regression; relation between correlation coefficient and regression coefficients, Fitting of regression equations, Standard error of estimates.
General Linear Model, Multiple Correlation	The General Linear Regression Model An Introduction to the matrix formulation and solution of the general linear regression Model. Solution for a model with one dependent and two independent variables. Prediction for simple regression models of demand, supply, production and cost. Multiple and partial correlations and regressions. Relationship between the measures of multiple correlation and measures of partial correlation, Beta coefficients
Probability, Sampling, Tests of Hypothesis	Elements of Probability Theory The Concept of Probability Distribution and a Density function. Mathematical expectation, Binomial distribution, the Normal distribution, Some properties of the normal distribution. Sampling and sample designs: simple random sampling, stratified random sampling, systematic sampling and cluster sampling. Large samples. Tests of significance. Limitation of sampling; procedure of testing hypothesis: Region of acceptance and rejection, two tailed and one tailed tests, Type I and Type II errors. Non-Parametric Tests: The sign test, rank sum test, the Mann-Whitney U test, advantages and limitations of non-parametric tests.
Test of Significance, ANOVA	Tests of Significance Standard error of the mean, Student's "t" distribution and its properties, Use of the "t" distribution to test hypothesis of the population means. Chi Square: general features of Chi Square ($\chi 2$), chi square as a test of goodness of fit, chi square as a test of independence. Contingency table and Yate's correction for continuity, testing homogeneity of several independent estimates of population variance. Analysis of variance; meaning, assumptions and techniques of analysis of variance, one way and two-way analysis of variance problem. Inter relationship between "t", Chi square and F tests
Time Series, Index Numbers	Analysis of Time Series Meaning and components of time series, Methods of estimating trend – the semi average method, the moving average method and the least squares method. Fitting of straight line, second- and third-degree equations. Fitting of the modified exponential curve, Gompertz curve and the logistic curve. Measurement of Seasonal, Cyclical and irregular variations. Index numbers: Meaning, problems in construction of index numbers. Classification of index numbers, unweighted price index numbers, relative of aggregate method and average of price relatives, Weighted price index numbers: Laspeyre's, Paasche's and Fisher's ideal index numbers. Time reversal test and factor reversal test and chain-based index numbers. Uses and limitations of index numbers

M.A. 2nd Sem. – ECONOMICS (CBCS)

Title of the Course: Evaluating Contemporary Economic Issues

AECC-II/MEA-25

Unit	Topic	Details
1	Project Writing,	Guidance for project writing: Identifying the topic, Review of Literature, Writing Project Report – Referencing Styles and use of referencing software.
2	Analysis	Analyzing economics in the news Writing article about contemporary economic event (National &/or Global) using knowledge of economic theory, Analysis of contemporary Indian Economic Data and Policies Economic survey, budget, annual policy data, RBI, Monthly Economic Data - Ministry of Finance.

M.A. 2nd Sem. – ECONOMICS (CBCS)

Title of the Course: Evaluating Contemporary Economic Issues

AECC-II/MEA-25

MA 3rd Sem. – Economics (CBCS)

Title of the Course Research Methodology

DSC/ MEC-33

Unit	Details
I	Scientific Methods of Research Definition of research, assumptions, operations and aims of scientific research. The research process; conceptual, empirical and analytical phases of research. Essential criteria for scientific methods. Research designs: observational Studies; descriptive, explanatory, exploratory and evaluative studies. Experimental studies; pre-test design, posttest design, follow-up or longitudinal design. Action research studies and panel studies.
II	Methods of Data Collection: Collection of primary data. Selection of appropriate method for data collection; interview schedule, questionnaire, case history and case study method. Tools of Data Collection: schedule and questionnaire, construction of schedule and questionnaire, qualities of a good schedule and questionnaire. Guidelines for successful interviewing. Collection of secondary data - population (sex wise data) labour force, occupational, educational and vital statistics. Focus Group discussion (FGD), content analysis, social mapping, social networking and mystery client technique.
III	Sampling Techniques Complete enumeration versus sampling. Concept of Sampling unit, Sampling frame and sampling design. Sampling methods: simple random sampling, stratified sampling, Systematic sampling, cluster Sampling and purposive sampling. Multistage sampling in large-scale surveys, self- weighting designs, stratification in multistage sampling. Sampling and non-sampling errors, calculation of weights, sample size determination
IV	Measurement Reliability and validity of measurement: Face, Content, Construct, convergent, concurrent and predictive validity. Scaling techniques: attitude scales, point scales, ranking scales, rating scales, limitations of attitude scales. Techniques of scale construction: Bogardus, Guttman, Likert, Semantic and Thurstone Scale. Data collection, processing and analysis: editing, coding, data entry, validation and analysi
V	Writing Research Proposal and Report Purpose of a proposal/ report. Content of proposal/ report: introductory section, methodology adopted, analysis and inferences, summary, Conclusion and recommendations. References/ Bibliography, appendices, footnotes. Examples of some hypothetical proposals.