

Part B

Programme: Master of Commerce (Semester III)

Code of Course: Subject	Title of Course: Subject	Total No. of Periods
M.Com.- 32	Statistical Analysis	75

Course Outcomes: After going through the subject Statistical Analysis, the student will be able to:

1. Understand the concept, identify and describe the types of correlation (positive, negative, zero) and explore and explain the methods used to study correlation.
2. Understand the concept and solve problems involving regression equations and calculate regression coefficients.
3. Understand the concept of sampling and different sampling methods (random sampling, stratified sampling, cluster sampling, etc.). Differentiate between sampling and non-sampling errors. Identify and explain common sources of non-sampling errors. Understand the concept of sampling distributions and their properties (mean, variance, shape). Calculate and interpret sampling distribution characteristics.
4. Understand the concepts of statistical estimation and hypothesis testing
5. Differentiate between point estimation and interval estimation. Solve problems related to point and interval estimation of population mean. Calculate point estimates and construct confidence intervals for population means.
6. Calculate variance for proportions
7. Conduct statistical tests of hypotheses and identify type I and type II errors.
8. Solve problems involving the F-test for comparing variances or testing model significance.
9. Apply the t-test for small samples and z-test for large samples to test hypotheses about population means.
10. Understand the chi-square test for goodness of fit and its applications. Also understand, apply and interpret degrees of freedom in the context of chi-square tests.
11. Solve problems using the parabolic curve and binomial expansion method for interpolation and extrapolation.
12. Understand the concept and types of index numbers (price index, quantity index, composite index, etc.). Solve problems involving the simple (unweighted) aggregate method and weighted index number methods (Laspeyre's, Paasche's, Fisher's, Marshall-Edgeworth) for constructing index numbers.
13. Understand the concept of statistical quality control and different quality control methods (control charts, process capability analysis, acceptance sampling). Determine and set up control limits for control charts. Construct control charts (X-bar chart, R-chart, p-chart, c-chart) and interpret the results.
14. Understand the importance and applications of time series analysis. Identify and describe the components of time series (trend, seasonality, cyclical variations, irregular variations). Apply different methods (moving averages, least squares) to measure and analyze trends in time series data. Choose appropriate trend models (linear, exponential, quadratic) based on the merits and limitations of each model. Use methods (simple averages, ratio-to-moving-average) to measure and analyze seasonal variations in time series data, considering their merits and limitations.

Unit	Contents	No. of Periods
I	1.1 Correlation 1.1.1 Meaning and definition of Correlation, Types of Correlation, Methods of studying Correlation 1.1.2 Problems on Spearman's Rank Correlation Method (when ranks are given, when ranks are not given and when ranks are repeated). 1.1.3 Problems on Concurrent Deviation Method 1.2 Regression Analysis: 1.2.1 Problems on Regression Equations; Regression co-efficient.	15
II	2.1 Sampling and Data collection: 2.1.1 Sampling and Sampling Method 2.1.2 Sampling and non-sampling errors 2.1.3 Sampling distributions and their characteristics 2.1.4 Statistical Estimation and Testing 2.1.5 Point and interval estimation of population mean 2.1.6 Proportion variance; Statistical testing-hypotheses and errors 2.1.7 Problems on F test	15
III	3.1 Small and Large Sampling:	15

	3.1.1 Problems on t test (Small Sampling) 3.1.2 Problems on Z test (Large Sampling) 3.2 Chi Square Test: 3.2.1 Chi-square Test and Goodness of fit, Meaning of Degree of freedom, uses of Chi-square test. 3.2.2 Problems on Chi-square test.	
IV	4.1 Interpolation and Extrapolation: 4.1.1 Problems on Parabolic Curve Method 4.1.2 Problems on Binomial Expansion Method 4.2 Index numbers: 4.2.1 Meaning and types 4.2.2 Methods of constructing Index numbers 4.2.3 Problems on Simple (unweighted) Aggregate Method 4.2.4 Problems on Weighted Index numbers: Laspeyre's Price Index, Paasche's Method, Fisher's Ideal Index Method, Marshall Edgeworth Index numbers 4.2.5 Time reversal test and factor reversal test satisfied by Fisher's Ideal Index Numbers 4.2.6 Consumer Price Index Numbers (Cost of Living Index)	15
V	5.1 Statistical Quality Control : 5.1.1 Concept, Quality control methods 5.1.2 How to set-up the control limits 5.1.3 Constructing control charts. 5.2 Analysis of Time Series : 5.2.1 Utility of Time series Analysis; 5.2.2 Components of Time series, 5.2.3 Methods of measuring Trend with merits and limitations; Selecting the type of trend with merits and limitations; Methods of measuring seasonal variations with merits and limitations. 5.2.4 Problems on Least Square Method to fit straight line trend, 5.2.5 Problems on Moving Average Method 5.2.6 Problems on Seasonal Variations (Method of Simple Averages)	15

Reference Books:

- 1) Statistics for Business and Economics: By Hood R.P (Publisher : Macmillon, New Delhi)
- 2) Statistics for Management: By Levin Richard I and Devid S. Rubin (Publisher-Prentice Hall, Delhi)
- 3) Fundamentals of Statistics: By D.N.Elhance.
- 4) Statistics: Theory, Methods and Application: By D.C.Sancheti, V.K.Kapoor (Publisher - S.Chand)
- 5) सांख्यिकीकेसिद्धांत : By Dr.Shukla & Sahay.
- 6) सांख्यिकीय: By B.N.Gupta.
- 7) सांख्यिकीकेमूलसिद्धांतGupta.P.By S :Statistical Methods .8Kapoor .N.By K :
- 8) Fundamentals of Applied Statistics: By S.C.Gupta & V.K.Kapoor. Applied Statistics: By Bowley.
- 9) Modern Approach to Statistics: By Dr. Varsha S. Sukhadeve, Sugawa Prakashan, Pune 30.
- 10) A Text Book on Business Mathematics & Statistics: Dr. Varsha S. Sukhadeve, Sugawa Prakashan, Pune.
- 11) सांख्यिकीतत्वआणिव्यवहार:एस. एस. कोलते, पिंपळापुरेअँडकं. पब्लिशर्स, नागपूर.