Semester - III
Paper – G 303: BUSINESS STATISTICS
Full Marks: 100 (Internal Assessment 20 + 80 End-Term)
Lectures: 45, Practical: 26 Hours, Tutorial: 7 Hrs

Objective: The objective of this course is to familiarise students with the basic statistical tools used for managerial decision-making.

Unit 1:Statistical Data and Descriptive Statistics **7 L + 1 T**

a. Nature and Classification of data: univariate, bivariate and multivariate data; time-series and cross-sectional data
b. Measures of Central Tendency
    i. Mathematical averages including arithmetic mean, geometric mean and harmonic mean. Properties and applications.
    ii. Positional Averages Mode and Median (and other partition values including quartiles, deciles, and percentiles) (including graphic determination)
c. Measures of Variation: absolute and relative. Range, quartile deviation, mean deviation, standard deviation, and their coefficients, Properties of standard deviation/variance
d. Skewness: Meaning, Measurement using Karl Pearson and Bowley's measures; Concept of Kurtosis.

Marks:10

Unit 2: Probability and Probability Distributions **9 L + 1 T**

a. Theory of Probability. Approaches to the calculation of probability; Calculation of event probabilities. Addition and multiplication laws of probability (Proof not required); Conditional probability and Bayes' Theorem (Proof not required)
b. Expectation and variance of a random variable
c. Probability distributions:
    i. Binomial distribution: Probability distribution function, Constants, Shape, Fitting of binomial distribution
    ii. Poisson distribution: Probability function, (including Poisson approximation to binomial distribution), Constants, Fitting of Poisson distribution
    iii. Normal distribution: Probability distribution function, Properties of normal curve, Calculation of probabilities.

Marks:16

Unit 3: Simple Correlation and Regression Analysis **8 L + 1 T**

a. ***Correlation Analysis***: Meaning of Correlation: simple, multiple and partial; linear and non-linear, Correlation and Causation, Scatter diagram, Pearson's co-efficient of correlation; calculation and properties (Proof not required). Correlation and Probable error; Rank Correlation
b. ***Regression Analysis***: Principle of least squares and regression lines, Regression equations and estimation; Properties of regression coefficients; Relationship between Correlation and Regression coefficients; Standard Error of Estimate and its use in

interpreting the results. **Marks: 16**

Unit 4: Index Numbers **8 L + 1 T**

Meaning and uses of index numbers; Construction of index numbers: fixed and chain base: univariate and composite. Aggregative and average of relatives – simple and weighted Tests of adequacy of index numbers, Base shifting, splicing and deflating. Problems in the construction of index numbers; Construction of consumer price indices: Important share price indices, including BSE SENSEX and NSE NIFTY.

Marks: 16

Unit 5: Time Series Analysis **8 L + 1 T**

Components of time series; Additive and multiplicative models; Trend analysis: Fitting of trend line using principle of least squares – linear, second degree parabola and exponential. Conversion
of annual linear trend equation to quarterly/monthly basis and vice-versa; Moving averages; Seasonal variations: Calculation of Seasonal Indices using Simple averages, Ratio-to-trend, and Ratio-to-moving averages methods. Uses of Seasonal Indices. **Marks: 14**

UNIT 6: Sampling Concepts, Sampling Distributions and Estimation: **5 L + 1 T**

Sampling: Populations and samples, Parameters and Statistics, Descriptive and inferential statistics; Sampling methods (including Simple Random sampling, Stratified sampling, Systematic
sampling, Judgement sampling, and Convenience sampling)

Concept of Sampling distributions and Theory of Estimation: Point and Interval estimation of means (large samples) and proportions. **Marks: 8**

Practical Lab: 26

The students will be familiarized with software (Spreadsheet and/or SPSS) and the statisticaland other functions contained therein related to formation of frequency distributions andcalculation of averages, measures of Dispersion and variation, correlation and regression coefficient.

Note:

1. There shall be 4 Credit Hrs. for Lectures + one Credit hr. (Two Practical Periods per week per batch) for Practical Lab + one credit Hr for Tutorials (per group)

2. Latest edition of text books may be used.

Suggested Readings:

1. Levin, Richard, David S. Rubin, Sanjay Rastogi, and HM Siddiqui. *Statistics for Management*. 7th ed., Pearson Education.

2. David M. Levine, Mark L. Berenson, Timothy C. Krehbiel, P. K. Viswanathan, *Business Statistics: A First Course*, Pearson Education.

3. Siegel Andrew F. *Practical Business Statistics*. McGraw Hill Education.