SEMESTER – II **PAPER – 2.2**

Business Mathematics and Statistics

Full Marks : 100

Objective: To familiarize the students with various concepts and tools thatcan be used for effective decision making. Emphasis will be on the application of theconcepts learnt.

Course contents:

Unit I: ***(10L)***

Basic concept of permutation and combination including restricted cases, Derivative of a function up to 2^{nd} order (Trigonometric function excluded), partial derivative up to 2^{nd} order, derivative by total differential, Application of derivative: slope measure, Rate measure, Increasing, decreasing function, Maximum – Minimum value, cost function, MR, MC, AC, AVC.

Unit II:

Measures of central tendency: (5L)

Mean (arithmetic mean, geometric mean, harmonic mean), Merits, limitations and suitability of averages, relation between averages, median, mode, quartile, decile, percentile ,Determination of mode from Histogram and partition values from ogive.

Measures of Dispersion: (4L)

Range, Quartile deviation, mean deviation, standard deviation and their coefficients, combined standard deviation for two groups.

Moments, Skewness, Kurtosis: (4L)

Raw moments, central moments, relation between raw and central moments, b_1 and b_2 coefficients, different measures of skewness and kurtosis.

Unit III:

Correlation Analysis: (4L)

Meaning and significance, correlation and causation, types of correlation, methods of studying simple correlation – scatter diagram, Karl Pearson's coefficients of correlation, Spearman rank correlation coefficient, properties: $-1 \leq r \leq 1$, independent of origin and scale

Regression Analysis: (3L)

Meaning and significance, Derivation of regression equations by least squares method, properties of regression equations, interpretation of regression coefficients.

Unit IV:

Analysis of Time Series: (4L)

Meaning and significance, Utility, different components of time series, Models (Additive and Multiplicative), measurement of trend byleast square method: linear & parabolic.

Index Numbers: (5L)

Meaning and significance, problems in construction of Index numbers, methods of constructing index numbers – weighted and unweighted, Laspeyre's, Paasche's, Edgeworth – Marshall's, Fisher's index numbers, Price relatives, Test of adequacy of index numbers, Chain base index number, Cost of living index number, Base shifting, splicing and deflating index number, Real wage and Purchasing power.

Unit V:

Probability Theory: (7L)

Basic terminologies, different definitions, total probability, conditional probability, compound probability and Bayes theorem

Probability Distributions: (8L)

Random variable, idea of probability mass function and probability density function, concepts of expectation, variance, skewness and kurtosis, properties and applications of Binomial, Poisson ,Normal distribution and Exponential distribution, Concept of Central limit theorem

Unit VI

Sampling Theory and Estimation: (6L)

Meaning and significance, Parameter and Statistic, Standard error of a Statistic (sample mean, sample proportion), Sampling Distribution, Basic Concept of estimation

Testing of Hypothesis: (10L)

Basic Terminologies, level of significance, hypothesis testing, Test of hypothesis concerning mean, proportion (z test, t test), Tests ofgoodness of fit and independence of attributes using Chi square .

Suggested Readings:

1. J. Chakrabarty Business Mathematics &Statistics , Dey Book Concern
2. Business Mathematics and Statistics- N G Das & J K Das (Tata McGraw Hill)
3. Statistics For Business Decisions – J. K .Das (Academic Publishers)
4. Gupta, S. C. *Fundamentals of Statistics*, Himalaya Publishing House
5. Levin, R. I. and Rubin, D.S*Statistics for Management*, Prentice-Hall of India
6. Aczel ,A. D. and Sounderpandian, J.*Complete Business Statistics*, Tata McGraw Hill
7. Applied Multivariate Statiatical Analysis – Johnson, R. A. and Wichern, D. W. (Prentice-Hall of India)
8. Quantitative Techniques for Managerial Decisions – U.K.Srivastava, G.V.Shenoy and S.C. Sharma (New Age International)
9. Business Statistics – J. K. Sharma(Pearson Education)
10. Forecasting Methods and Applications – S. Makridakis, S. C. Wheelwright and R.J. Hyndman (John Wiley and Sons)