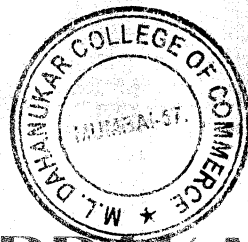


2014-2015

Vipul's
B.Sc. (IT) Series

**Quantitative
Techniques**

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V. A. JADHAV



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VIPUL PRAKASHAN
MUMBAI - 400 004

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B.Sc. (IT) COURSE
W.E.F. JUNE, 2011

QUANTITATIVE TECHNIQUES

(B.Sc. (IT) Second Year : Fourth Semester)

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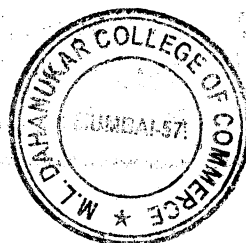
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The
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Syllabus

UNIT - I:

Errors, Solutions of Algebraic and Transcendental Equations using: Bisection Method, the Method of False Position, Newton-Raphson Method. **Interpolation:** Interpolation - Forward difference, Backward Difference, Newton's Forward Difference Interpolation, Newton's Backward Difference Interpolation, Lagrange's Interpolation.

UNIT - II:

Solution of simultaneous algebraic equations (linear) using iterative methods: Gauss-Jordan Method, Gauss-Seidel Method, Numerical Integration: Trapezoidal Rule, Simpson's 1/3rd and 3/8th rules. Numerical solution of 1st and 2nd order differential equations: Taylor series, Euler's Method, Modified Euler's Method, Runge-Kutta Method for 1st and 2nd Order Differential Equations.

UNIT - III:

Random variables: Discrete and Continuous random variable, Probability density function, Probability distribution of random variables, Expected value, Variance. **Moments and moment generating functions:** Relation between Raw moments and Central moments.

Distributions: Binomial, Poisson, Normal, exponential, uniform distributions for detailed study, Central Limit theorem (statement only) and problems based on this theorem.

UNIT - IV:

Fitting of curves: Least square method, Fitting the straight line and parabolic curve, Correlation, Covariance, Karl Pearson's coefficient and Spearman's Rank, correlation coefficient, Regression coefficients and lines of regression.

UNIT - V:

Sampling distribution: Test of Hypothesis, Level of Significance, Critical Region, One Tailed and Two Tailed Test, Interval Estimation of Population Parameters, Test of Significance for large Samples and small Samples, Student's 't' Distribution and its properties.

UNIT - VI:

Chi-Square Distribution and its properties, Test of the Goodness of Fit and Independence of Attributes, Contingency Table, Yates Correction.
Mathematical Programming: Linear optimization problem, Formulation and Graphical solution, Basic solution and Feasible solution, Primal Simplex Method.

Term Work:

Assignments: Should contain at least 6 assignments (one per unit) covering the Syllabus.

Practical List to be performed in Scilab:

- (1) **Practical 1: Solution of algebraic and transcendental equations:**
(a) Program to solve algebraic and transcendental equation by bisection method.
(b) Program to solve algebraic and transcendental equation by false position method.

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(c) Program to solve algebraic and transcendental equation by Newton Raphson method.

(2) Practical 2: Interpolation:

- (a) Program for Newton's forward interpolation.
(b) Program for Newton's backward interpolation.
(c) Program for Lagrange's interpolation.

(3) Practical 3: Solving linear system of equations by iterative methods:

- (a) Program for solving linear system of equations using Gauss Jordan methods.
(b) Program for solving linear system of equations using Gauss Seidel methods.

(4) Practical 4: Numerical Integration:

- (a) Program for numerical integration using Trapezoidal rule.
(b) Program for numerical integration using Simpson's 1/3rd rule.
(c) Program for numerical integration using Simpson's 3/8th rule.

(5) Practical 5: Solution of differential equations:

- (a) Program to solve differential equation using Euler's method.
(b) Program to solve differential equation using modified Euler's method.
(c) Program to solve differential equation using Runge-Kutta 2nd order and 4th order methods.

(6) Practical 6: Random number generation and distributions:

- (a) Program for random number generation using various techniques.
(b) Program for fitting of Binomial Distribution.
(c) Program for fitting of Poisson Distribution.
(d) Program for fitting of Negative Binomial Distribution.

(7) Practical 7: Moments, Correlation and Regression:

- (a) Computation of raw and central moments, and measures of skewness and kurtosis.
(b) Computation of correlation coefficient and Fitting of lines of Regression (Raw and Frequency data)
(c) Spearman's rank correlation coefficient.

(8) Practical 8: Fitting of straight lines and second degree curves:

- (a) Curve fitting by Principle of least squares. (Fitting of a straight line. Second degree curve)

(9) Practical 9: Sampling:

- (a) Model sampling from Binomial and Poisson Populations.
(b) Model sampling from Uniform, Normal and Exponential Populations.
(c) Large sample tests (Single mean, difference between means, single proportion, difference between proportions, difference between standard deviations.)

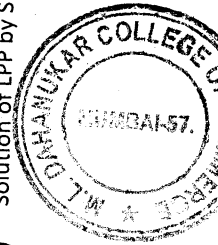
- (d) Tests based on students t-test (Single mean, difference between means and paired 't')

(10) Practical 10: Chi-square test and LPP:

- (a) Test based on Chi-square-Distribution (Test for variance, goodness of Fit.)
(b) Chi-square test of independence of attributes.
(c) Solution of LPP by Simplex method.

Principal

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