BCA520D1A: NUMERICAL METHODS

CREDITS: THEORY: 4; PRACTICAL: 2
MAX. MARKS: THEORY: 60; PRACTICAL: 30
MIN. MARKS: THEORY: 24; PRACTICAL: 12

THEORY: 60 LECTURES

UNIT-I **(15 Lectures)**

Floating point representation and computer arithmetic, Significant digits, Errors: Round-off error, Local truncation error, Global truncation error, Order of a method, Convergence and terminal conditions, Efficient computations

UNIT-II **(15 Lectures)**

Bisection method, Secant method, Regula-Falsi method

Newton-Raphson method, Newton's method for solving nonlinear systems

Gauss elimination method (with row pivoting) and Gauss-Jordan method, Gauss Thomas method for tridiagonal systems

UNIT-III **(15 Lectures)**

Iterative methods: Jacobi and Gauss-Seidel iterative methods

Interpolation: Lagrange's form and Newton's form

Finite difference operators, Gregory Newton forward and backward differences Interpolation Piecewise polynomial interpolation: Linear interpolation, Cubic spline interpolation (only method), Numerical differentiation: First derivatives and second order derivatives, Richardson extrapolation

UNIT-IV **(15 Lectures)**

Numerical integration: Trapezoid rule, Simpson's rule (only method), Newton-Cotes open formulas

Extrapolation methods: Romberg integration, Gaussian quadrature, Ordinary differential equation: Euler's method

Modified Euler's methods: Heun method and Mid-point method, Runge-Kutta second methods: Heun method without iteration, Mid-point method and Ralston's method Classical 4th order Runge-Kutta method, Finite difference method for linear ODE

REFERNCE BOOKS:

[1] Laurence V. Fausett, Applied Numerical Analysis, Using MATLAB, Pearson, 2/e (2012)

[2] M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publisher, 6/e (2012)

[3] Steven C Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, Tata McGraw Hill, 2/e (2010)

LAB: BCA520D1A: NUMERICAL METHODS **(CREDITS: 2; LECTURES:60)**

1. Find the roots of the equation by bisection method.
2. Find the roots of the equation by secant/Regula-Falsi method.
3. Find the roots of the equation by Newton's method.
4. Find the solution of a system of nonlinear equation using Newton's method.
5. Find the solution of tridiagonal system using Gauss Thomas method.
6. Find the solution of system of equations using Jacobi/Gauss-Seidel method.
7. Find the cubic spline interpolating function.
8. Evaluate the approximate value of finite integrals using Gaussian/Romberg integration.
9. Solve the boundary value problem using finite difference method.

BCA520D1B: INFORMATION SECURITY

CREDITS: THEORY: 4; PRACTICAL: 2
MAX. MARKS: THEORY: 60; PRACTICAL: 30
MIN. MARKS: THEORY: 24; PRACTICAL: 12

THEORY: 60 LECTURES

UNIT I

1. Introduction (5 Lectures)

Security, Attacks, Computer Criminals, Security Services, Security Mechanisms.

2. Cryptography (10 Lectures)

Substitution ciphers, Transpositions Cipher, Confusion, diffusion, Symmetric, Asymmetric Encryption. DES Modes of DES, Uses of Encryption, Hash function, key exchange, Digital Signatures, Digital Certificates.

UNIT II (8 Lectures)

3. Program Security

Secure programs, Non malicious Program errors, Malicious codes virus, Trap doors, Salami attacks, Covert channels, Control against program

4. Threats. (7 Lectures)

Protection in OS: Memory and Address Protection, Access control, File Protection, User Authentication.

UNIT HI (7 Lectures)

5. Database Security

Requirements, Reliability, Integrity, Sensitive data, Inference, Multilevel Security.

6. Security in Networks (8 Lectures)

Threats in Networks, Security Controls, firewalls, Intrusion detection systems, Secure e-mails

UNIT IV

7. Administrating Security (15 Lectures)

Security Planning, Risk Analysis, Organisational Security Policy, Physical Security. Ethical issues in Security: Protecting Programs and data. Information and law.

Recommended Books:

1. C. P. Pfleeger, S. L. Pfleeger; Security in Computing, Prentice Hall of India, 2006
2. W. Stallings; Network Security Essentials: Applications and Standards, 4/E, 2010

LAB: BCA520D1B: INFORMATION SECURITY (CREDITS: 2; LECTURES:60)

1. Demonstrate the use of Network tools: ping, ipconfig, ifconfig, tracert, arp, netstat, whois
2. Use of Password cracking tools: John the Ripper, Ophcrack. Verify the strength of passwords using these tools.
3. Perform encryption and decryption of Caesar cipher. Write a script for performing these operations.
4. Perform encryption and decryption of a Rail fence cipher. Write a script for performing these operations.
5. Use nmap/zenmap to analyse a remote machine.
6. Use Burp proxy to capture and modify the message.
7. Demonstrate sending of a protected word document.
8. Demonstrate sending of a digitally signed document.
9. Demonstrate sending of a protected worksheet.
10. Demonstrate use of steganography tools.
11. Demonstrate use of gpg utility for signing and encrypting purposes.