BCA116 Numerical Methods

Floating point representation of numbers, Errors in numerical computations, sources of errors, significant digits.

Roots of Non-linear Algebraic and Transcendental Functions , Bisection, regula-falsi, secant and Newton-Raphson Methods ; fixed points iteration, Rate of convergence.

Numerical solution of system of linear equation, Gauss elimination method, ill-conditioned systems, Gauss-seidel and Jacobi methods , Rate of convergance.

Polynomials interpolation: Finite differences, Newton's forward and backward differences interpolation polynomials, Lanrange's interpolation polynomial.

Numerical differentiation and integration, Formulae for derivatives in the case of equally spaced points, Trapezoidal and Simpson rules, Errors in integration formulae

Single-step and multistep methods for solving ordinary differential equations: Taylor series method, Euler's method, Modified Euler's method, Runge-kutta methods,

References:

1. Numerical Methods for Science and Engg.-Ralph G. Stanton Prentice-Hall of India
2. Elementary Numerical Analysis An algorithmic approach. S.D Conte and Carl de Boor

BCA117 Operating System

Introduction:
Definition and types of Operating systems, Batch Systems, Multiprogramming, TimeSharing, Parallel, Distributed and Real-Time Systems, Operating System Structure, Operating System Components and Services, System Calls, System Programs, Virtual Machines.

Process Management:
Process Concept, Process Scheduling, Cooperating Processes, Threads, Interprocess Communication, CPU Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling and Algorithm evaluation.

Process Synchronization And Deadlocks:
The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors, Deadlocks-System Model, Characterization, Deadlock Prevention, Avoidance and Detection, Recovery from Deadlock, Combined approach to Deadlock Handling.

Memory Management:
Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with Paging, Virtual Memory, Demand Paging and its performance, Page Replacement Algorithms, Allocation of Frames, Thrashing, Page Size and other considerations, Demand Segmentation.

File Management and Security:
File Systems, Secondary Storage Structure, File concept, Access methods, Directory implementation, Efficiency and performance, Recovery.

Security: Safeguards, Penetration, Access and Information flow control, Protection problems, Formal models of protection.

References:

1 Introduction to Operating Systems: Deitel
2 Operating System Concepts: Peterson and Silbershatz
3 Modern Operating Systems: Andrew S Tanenbaum

BCA118 Dot Net and C# Programming

The .Net Framework
Introduction, DLL Hell, CLR, CTS, MSIL

Basic C#
Introduction , Data Types , Identifiers , Arrays , Error Handling

Win Forms Programming
Introduction , Window Controls – TextBox , Radio , CheckBox , Combo , PictureBox , Menu , Tab , Progress Bar , ListView , Report Viewer

OOPS in .Net
Base Class Library , Namespace and its importance , System Namespace & Other Important Namespaces , Class / Object , Inheritance , Polymorphism , Abstract Class , Interfaces , Events & Delegates

Process and Threads
Threads , Creation/Stopping Of Threads , Thread Pool Concept , Monitoring a thread , Synchronizing Multiple Threads

Assemblies & their Importance
Assemblies , Private Assembly , Signing an Assembly , Shared Assemblies, Reflection

References:

1. C# Black Book by Matt Telles
2. Complete Reference ASP. Net by MacDonand, TMH
3. C# Programming Bible by Jeff Ferguson, Brian-Patterson, Wiley
4. Wrox's Visual C# 2005 Express Edition, by F. Scott-Barker, Wiley

BCA119 Cyber Law and Internet Security

Internet Security:
Security Issues on Web, Importance of Firewall, Components of Firewall, Transaction Security, Emerging Client Server, Security Threats, Network Security, Factors to Consider In Firewall Design, Limitation of Firewalls.

Encryption:
Encryption Techniques, Symmetric Encryption- Keys and Data Encryption Standard, Asymmetric Encryption- Secret Key Encryption, Public and Private Pair Key Encryption, Digital Signatures and its requirement.

Fundamentals of Cyber Law:
Jurisprudence of Cyber Law, Object and Scope of the IT Act, Introduction to Indian Cyber Law, Indian Perspective, Overview of Intellectual property related legislation in India, Patent, Copy Right, Trademark law.

Investigation and Ethics:
Cyber Crime, Cyber Jurisdiction, Cyber Crime and Evidence Act, Ethical Issues in Data and Software Privacy, Plagiarism, Software Piracy, Viruses, Trojan horse, Malicious Code & Logic Bombs, Introduction to Biometric Security and its Challenges.

References:

1. Harish Chander "Cyber Law and IT Protection", PHI Publication
2 Merkov, Breithaupt, "Information Security", Pearson Education
3. Farooq Ahmad, "Cyber Law in India", Pioneer books.
4. K. K. Singh, Akansha Singh "Information Security and Cyber law", Umesh Publication.

BCA120 Software Engineering

Evolution & Scope of Software Engineering
Introduction to Software Engineering: Software development process, Life Cycle models – Waterfall, Spiral, Evolutionary, Prototype

Software Production Process
Process Models - ; Methodologies; Standards

Software Project Management
4 Ps; Project Planning; Cost estimation – Loc, Function point, COCOMO; Work estimation; Resource estimation; Risk Analysis, Project Scheduling; Quality Plans; Project control

Software Testing
Black box vs White Box; Testing in the large vs Testing in the small; System Testing; Debugging; Validation vs Verification

Software Design
Abstraction; Modularity; Cohesion; Coupling

Software Quality Assurance
Quality Models; Software Quality Assurance Activities, Software configuration management; Software Reliability; Introduction to SEI-CMM

Software Maintenance
Maintenance concepts and tasks; Side effects; Reverse Engineering; Re-engineering

References:

1. Software Engineering: Ian Sommerville, Pearson Education
2. Software Engineering: R. S. Pressman, McGraw Hill
3. An Integrated Approach to Software Engineering: Pankaj Jalotes