FIFTH SEMESTER

BCA-S501: Software Engineering

UNIT-I

Software Engineering Fundamentals: Definition of Software, Software characteristics, Software Applications.

Software Process: Software Process Models - Waterfall model, prototyping model, spiral model, incremental model, concurrent development model.

Project management Concepts: The Management Spectrum - The People , The Product , The Process , The Project.

UNIT-II

Software Process and Project Metrics: Measures, Metrics and Indicators, Software measurement: Size - Oriented Metrics, Function - Oriented Metrics, Extended Function point metrics

Software Project Planning: Project Planning Objectives, Software Project Estimation, and Decomposition Techniques - Problem Based Estimation, Process Based Estimation, Empirical Estimation Models- The COCOMO Model

Risk Analysis and Management: Software risks, Risk identification, Risk Projection, Risk Refinement, Risk Mitigation, Monitoring and Management.

UNIT-III

Software Quality Assurance: Basic concepts- Quality, Quality Control, Quality Assurance, Cost of Quality , Software Quality Assurance (SQA) , Formal Technical Review

Software Configuration Management: Baselines, Software Configuration Items, the SCM Process, Version Control, Change Control, Configuration Audit, Status Reporting.

Analysis Concepts and Principles: Requirements Elicitation for Software**, Analysis** Principles **-** The Information Domain, Modeling, Partitioning, Essential and Implementation Views, Specification: Specification Principles, Representation, The Software Requirement Specification (SRS)

<center>**UNIT-IV**</center>

Design Concepts and Principles: Design Principles, Design Concepts – Abstraction, Refinement, Modularity, Software Architecture, Control Hierarchy, Structural Partitioning, Data Structure, Software Procedure, Information Hiding, Effective Modular Design- Cohesion, Coupling

Software Testing: Testing Objectives & principles, Unit Testing, Integration Testing (Top Down Integration , Bottom Up Integration , Regression Testing, Smoke Testing), Validation Testing (Alpha and Beta Testing), System Testing (Recovery Testing, Security Testing, Stress Testing, Performance Testing).

<center>**UNIT-V**</center>

Reengineering: Software Reengineering, Reverse Engineering, Restructuring, Forward Engineering

CASE Tools: What is CASE, Building Blocks of CASE, A Taxonomy of CASE Tools, Integrated CASE Environments, The Integration Architecture and The CASE Repository.

Recommended Books:
1. R. Pressman: Software Engineering, McGraw-Hill.
2. K.K. Agrawal and Y. Sing: Software Engineering, New Age International.
3. P. Jalote: Software Project Management in Practice, Pearson.

BCA-S502: JAVA Programming

UNIT-I

Introduction to Java: Bytecode, features of Java, data types, variables and arrays, operators, control statements.

Objects & Classes: Object Oriented Programming, defining classes, static fields and methods, object construction

UNIT-II

Inheritance: Basics, using super, method overriding, using abstract classes, using final with inheritance.

Packages and Interfaces: Defining a package, importing package, defining an interface, implementing and applying interfaces.

UNIT-III

Exception Handling: Fundamentals, exception types, using try and cache.

Multithreaded Programming: Creating a single and multiple threads, thread priorities, synchronization.

UNIT-IV

Applets: Applets basics, applets architecture, applets skeleton, the html applet tag, passing parameters in applets.

Event Handling: Event classes and event listener interfaces.

UNIT-V

Graphic Programming Introduction to swings.

Recommended Books:

1.   P. Naughton and H. Schildt: The complete reference to Java, Tata Mc-Graw Hill.
2.   Deitel and Dietel: How to program in Java

BCA-S503: Web Technology

UNIT I

INTRODUCTION
History of the Internet and World Wide Web – HTML 4 protocols – HTTP, SMTP, POP3, MIME, IMAP. Introduction to JAVA Scripts – Object Based Scripting for the web. Structures – Functions – Arrays – Objects.

UNIT II

DYNAMIC HTML
Introduction – Object refers, Collectors all and Children. Dynamic style, Dynamic position, frames, navigator, Event Model – On check – On load – Onenor – Mouse rel – Form process – Event Bubblers – Filters – Transport with the Filter – Creating Images – Adding shadows – Creating Gradients – Creating Motion with Blur – Data Binding – Simple Data Binding – Moving with a record set – Sorting table data – Binding of an Image and table.

UNIT- III

MULTIMEDIA

Audio and video speech synthesis and recognition - Electronic Commerce – E-Business Model – E-Marketing – Online Payments and Security – Web Servers – HTTP request types – System Architecture – Client Side Scripting and Server side Scripting – Accessing Web servers – IIS – Apache web server.

UNIT -IV

DATABASE- ASP – XML

Database, Relational Database model – Overview, SQL – ASP – Working of ASP – Objects – File System Objects – Session tracking and cookies – ADO – Access a Database from ASP – Server side Active-X Components – Web Resources – XML – Structure in Data – Name spaces – DTD – Vocabularies – DOM methods.

UNIT- V

SERVLETS AND JSP
Introduction – Servlet Overview Architecture – Handling HTTP Request – Get and post request – redirecting request – multi-tier applications – JSP – Overview – Objects – scripting – Standard Actions – Directives.
Brief survey of Web 2.0 technologies, introduction to Semantic web and other current technologies

Recommended Books:
 Deitel & Deitel, Goldberg, "Internet and world wide web – How to Program", Pearson Education Asia
REFERENCES
1. Eric Ladd, Jim O' Donnel, "Using HTML 4, XML and JAVA", Prentice Hall of India – QUE
2. Aferganatel, "Web Programming: Desktop Management", PHI
3. Rajkamal, "Web Technology", Tata McGraw-Hill,

BCA-504A: Network Management and Information Security

UNIT - I

Security and Cryptographic algorithm: Need for security, principle of security, types of attacks. Cryptographic techniques: cryptography terminology, substitution techniques, transposition techniques, Symmetric and asymmetric key algorithm, possible types of attack, key range, steganography. Symmetric vs asymmetric, algorithm types and modes, DES, double and triple DES, AES, comparison of various cryptographic algorithms and requirement of good cryptographic algorithm.

UNIT - II

Asymmetric cryptographic algorithm and Message Authentication: Public key cryptography principles and algorithms, RSA algorithm, Diffe-Hellman key exchange. One way hash functions, message digest, MD5, SHA1, message authentication code, Digital envelope and Digital signatures.

UNIT - III

Network Management: Management Standards and Models, configuration management, configuration database and reports, fault management, identification and isolation, protecting sensitive information, host and user authentication, structure of management information, Standard management information base, SNPv1 protocol, accounting management, performance management, network usage, matrics and quotas.

Network security: Overview of IPV4: OSI model, maximum transfer unit, IP, TCP, UDP, ICMP, ARP, RARP and DNS, ping, traceroute. Network attacks: Buffer overflow, IP scheduling, TCP session hijacking, sequence guessing. Network scanning: ICMP, TCP sweeps, basic port scans. Denial of service attacks: SYN flood, teardrop attacks, land, smurf attacks. Visual and private network topology: tunneling, IPSEC. Traffic protocols: authentication headers, ESP internet key exchange, security association PPTP, L2TP.

UNIT - IV

Web Security and Application Security: Web servers and browsers: security features, server privileges, active pages, scripting, security configuration setting for browsers, security of active content: JAVA, JAVA script, Active x, plug-ins, cookies. SSL & SET, security mail: PEM and PGP.

Firewalls: Firewall characteristics & design principles, types of firewalls, packet filtering router, application level gateway or proxy, content filters, bastion host. Firewall architectures: dual homed host, screening router, screened host, screened suvnet. Firewall logs.

UNIT - V

Instruction detection system: component of an IDS, placement of IDS components, types of IDS: network based IDS, file integrity checkers, host based IDS, IDS evaluation parameters.

Recommended book:

William Stallings: Network Security Essentials

BCA-504B: Client Server Computing

UNIT-1

Overview: definition, history, myths, transition to client server computing, database architectures, advantages and disadvantages of client server architecture.

Components : client, server, network, role and services of client-server, selection of operating system as client & server, types of client & servers, connectivity, peer-to-peer communication

Middle-ware : definition, role, 2 tier v/s 3 tiers, network file system, network operating system, API, RPC model & implementation

UNIT-II

Communication in client-server: Using OSI layer, TCP/IP networks.

Client/Server processing and application development: transaction processing, remote processing, distributed processing, distributed databases, development tools

UNIT-III

Distributed Objects: CORBA architecture and services, COM, DCOM, Java-RMI

Database Drivers: ODBC driver, JDBC driver.

Linking and Embedding: OLE and DDE

UNIT-IV

Data warehousing: operational data & analytical data, characteristics, architecture, Data warehouse options.

Oracle as database server: Memory architecture, Process architecture

Introduction to PL/SQL Programming: Data types, Control statements, cursors, triggers, exception handling, procedure and functions

UNIT-V

Managing C/S Applications: network management, database backup, database recovery, Data integrity, Data security.

Latest technology and tools used for Client Server Computing

Text/Reference books:

1. Client server Computing: Patrick Smith

2. Client Server survival guide, 3 rd Edition: Robert Orfali

3. Client server unleashed

BCA -S505: JAVA Programming Lab
Practical based on paper BCA 502

BCA- S506: Minor project
Based on Web Technology

BCA- S507: Practical on any one of the following

BCA-S507A Microsoft .NET Programming Lab
BCA-S507B Advanced Web Tools

BCA-S508: **Seminar**: Seminar topics to be allotted in the beginning of the course by issuing schedule of seminars including faculty seminars