

**SCHEME FOR BACHELOR OF COMPUTER APPLICATIONS (BCA)  
(2004 - 2007)**

**THIRD YEAR  
SEMESTER V (Starting from July 2006)**

SUBJECT CODE	SUBJECT NAME	Marks
5BCA1	COMPUTER NETWORKS	100
5BCA2	JAVA PROGRAMMING	100
5BCA3	A. LINUX AND SHELL PROGRAMMING <b>OR</b> B. EMBEDDED SYSTEMS	100
5BCA4	A. SOFTWARE ENGINEERING <b>OR</b> B. FUNDAMENTALS OF MATHEMATICS-IV (COUNTING PRINCIPLES, PROBABILITY AND STATISTICS)	100
5BCA5	A. PROGRAMMING WITH PERL <b>OR</b> B. .NET TECHNOLOGY	100

**SEMESTER VI -  
6 MONTH'S PROJECT WORK**

**PRACTICAL & CONTINUOUS EVALUATION**

**SEMESTER IV**

5BCA6	INTERNAL ASSESSMENT AND TERM WORK	100
5BCA6	COMPUTER LAB IX: JAVA	100
5BCA7	COMPUTER LAB X: ORACLE	100
5BCA8	PROFESSIONAL PERSONALITY SKILLS	50

**5BCA1-COMPUTER NETWORKS**

**UNIT-I**

Needs and Advantages - network, Types-server based, peer, hybrid, Server types, Network Topology-Bus, Star, Ring, Star bus, Star ring, Mesh, Network Protocols-Hardware Protocols, software Protocols, Selecting and design the network for an organization

**UNIT-II**

Signal Transmission-Digital signaling, Analog Signaling, Bit synchronization, Baseband and Broadband transmission, Network Media types- properties & specialties, comparative study, Network adapters – working principals, configuration and selection

**UNIT-III**

OSI and IEEE 802model, Ethernet – working principal, 10 & 100 MBPS Ethernet, Token Ring working principle, cabling, Hops, FDDI, Apple talk & ARCnet-Working and their components, Network Scaling-No. of computers, distance, software, speed, special requirements

**UNIT-IV**

Networking Technologies- Fiber Channel, ATM, Network connectivity – Hubs, repeaters, bridges, multiplexers, Internet connectivity – Routers and Brouters, gateways, CSUs/DSUs

**UNIT -V**

Various Server & Clients Hardware & software, Simple Installation and configuration of Windows NT, Novell NetWare-Server and clients. Simple network administration.

**TEXT & REFERENCE BOOKS :**

- ❑ James Chellis Charles Perkins, Matthew Strebe “Networking Essentials:Study Guide MCSE”, Second Edition, BPB Publications.
- ❑ S.K.Basandra & S. Jaiswal, “Local Area networks”, Galgotia Publications
- ❑ Gerd E. Keiser, “Local Area networks”
- ❑ Andrew & Tanenbaum, “Computer Network ”
- ❑ William Stallings, “Data and Computer Communication”
- ❑ Prakash C Gupta, “Data Communication”

## 5BCA2 – JAVA PROGRAMMING

### UNIT-I

C++ Vs JAVA, JAVA and Internet and WWW, JAVA support systems, JAVA environment.

JAVA program structure, Tokens, Statements, JAVA virtual machine, Constant & Variables, Data Types, Declaration of Variables, Scope of Variables, Symbolic Constants, Type Casting.

Operators : Arithmetic, Relational, Logical Assignments, Increment and Decrement, Conditional, Bitwise, Special, Expressions & its evaluation.

If statement, if...else... statement, Nesting of if...else... statements, else...if Ladder, Switch, ? operators, Loops – While, Do, For, Jumps in Loops, Labelled Loops.

### UNIT-II

Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods.

Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract methods and Classes, Visibility Control.

### UNIT-III

Arrays: One Dimensional & two Dimensional, strings, Vectors, wrapper Classes, Defining Interface Extending Interface, Implementing Interface, Accessing Interface Variable, System Packages, Using System Package, Adding a Class to a Packages, Hiding Classes.

### UNIT-IV

Creating Threads, Extending the Threads Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the Runnable Interface.

### UNIT-V

Local and Remote Applets Vs Applications, Writing Applets, Applets Life Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing Parameters to Applets, Aligning the Display, HTML Tags & Applets, Getting Input from the User.

#### TEXT & REFERENCE BOOKS:

- ❑ E. Balaguruswamy, "Programming in Java", 2nd Edition, TMH Publications
- ❑ Peter Norton, "Peter Norton Guide to Java Programming", Techmedia Publications



## 5BCA-3(A) – LINUX AND SHELL PROGRAMMING

### UNIT - I

Linux introduction and file system - Basic Features, Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell.

Linux File system-Boot block, super block, Inode table, data blocks, How Linux access files, storage files, Linux standard directories.

Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, creating and viewing files using cat, file comparisons – cmp & comm, View files, disk related commands, checking disk free spaces.

Partitioning the Hard drive for Linux, Installing the Linux system, System startup and shut-down process, init and run levels.

### UNIT-II

Essential linux commands Understanding shells, Processes in linux-process fundamentals, connecting processes with pipes, tee, Redirecting input output, manual help, Background processing, managing multiple processes, changing process priority with nice, scheduling of processes at command, cron, batch commands, kill, ps, who, sleep, Printing commands, find, sort, touch, file, file related commands-ws, sat, cut, dd, etc.

Mathematical commands- bc, expr, factor, units.

Creating and editing files with vi, joe & vim editor

### UNIT-III

System administration Common administrative tasks, identifying administrative files – configuratinn and log files, Role of system

administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disable user's accounts, creating and mounting file system, checking and monitoring system performance file security & Permissions, becoming super user using su.

Getting system information with uname, host name, disk partitions & sizes, users, kernel.

Backup and restore files, reconfiguration hardware with kudzu, installing and removing packages with rpm command.

Configure X-windows desktop-redhat-config-Xfree86, understanding XF86config file, starting & using X desktop. KDE & Gnome graphical interfaces, changing X settings.

#### **UNIT-IV**

Shell programming- Basic of shell programming, Various types of shell available in Linux, comparisons between various shells, shell programming in bash, read command, conditional and looping statements, case statements, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automate system tasks.

#### **UNIT-V**

Simple filter commands – pr, head, tail, cut, paste, sort, uniq, tr.

Filter using regular expressions – grep, egrep, and sed.

awk programming – report printing with awk.

#### **TEXTS & REFERENCES BOOKS :**

- **UNIX – Concepts & Applications (Third Ed.)** – Sumitabha Das, Tata McGraw Hill Publications.
- **Unix for programmers and users (Third Ed.)** – Graham Glass & King Ables, Pearson Education India. ( Low Prices Edition).
- **Red Hat Linux 9 Bible** – Cristopher Negus, IDG Books India Ltd.



### **5BCA-3(B) – EMBEDDED SYSTEMS**

#### **UNIT - 1**

Introduction to Embedded Systems: An Embedded System, Processor in the System, Other Hardware Units, Software Embedded into a System, Exemplary Embedded Systems, Embedded System-On-Chip (SOC) and in VLSI Circuit.

#### **UNIT-2**

**Processor and Memory Organization:** Structural Units in a Processor, Processor Selection for an Embedded System, Memory Devices, Memory Selection for an Embedded System, Allocation of Memory to Program Segments and Blocks and Memory Map of a System, Direct Memory Access, Interfacing Processor, Memories and I/O Devices.

#### **UNIT-3**

**Devices and Buses for Device Network:** I/O Devices, Timer and Counting Devices, Serial Communication Using the I<sup>2</sup>C, 'CAN' and Advanced I/O Buses between the Networked Multiple Devices, Host System or Computer Parallel Communication between the Networked I/O Multiple Devices Using the ISA, PCI, PCI-X and Advanced Buses.

#### **UNIT - 4**

**Device Drivers and Interrupts Servicing Mechanism:** Device Drivers, Parallel Port Device Drivers in a System, Serial Port Device Drivers in a System, Device Drivers for Internal Programmable Timing Devices, Context and the Periods for Context-Switching, Deadline and Interrupt Latency.

#### **UNIT - 5**

**Programming Concepts and Embedded Programming in C and C++ :** Software Programming in Assembly Language(ALP) and in High Level Language'C', 'C' Program Elements: Header and Source Files and Preprocessor Directives, Program Elements: Macros and Functions, Program Elements: Data Types, Data Structures Modifiers, Statements, Loops and Pointers, Queues, Stacks, Lists and Ordered Lists, Embedded Programming in C++, Embedded Programming in Java, 'C' Program Compiler and Cross-Compiler, Source Code Engineering Tools for Embedded C/C++, Optimisation of Memory Needs.

Real Time and Embedded System Operating System- necessity, features and qualities.

#### **TEXT & REFERENCE BOOK :**

- Embedded Systems : Architecture, Programming and Design by Raj Kamal, Tata McGraw Hill Publications.



**5BCA 4(A) - SOFTWARE ENGINEERING****UNIT-I**

Software: Software: Characteristic, components & application, Software Engineering - A Layered Approach, Software Process Software Process Models: Software Process Models: Linear Sequential Model, Prototype Model, Incremental Model & Spiral Model, Project Management Concepts: Project Management Concepts: People, Problem & Process Software Process & Project Metrics: Software Process & Project Metrics: Metrics in the process & project domains, Software measurement - Size Oriented Matrices, Function-Oriented Metrics, Extended Function Point Metrics, Metrics for software quality, integration metrics within the software process

**UNIT-II**

Software project planning: project planning objectives, Software scope, Resources - Human Resources, reusable software Resources, Environmental Resources Software Project Estimation Decomposition techniques, Empirical estimation models Software Quality Assurance: Software Quality Assurance: Quality Concepts, Quality Movements, SAQ activities, Statistical Quality Assurance, Software reliability, SAQ Plan, ISO9000 Quality standard

**UNIT-I**

Analysis Concepts & Principles: Requirements analysis, Analysis Principles-Information domain, Modeling, Partitioning , Analysis Modeling- Elements of the Analysis model, Data modeling-Data objects, attributes, Relationships, Cardinality, Modality, Entity-relationship diagrams, Functional modeling & information flow -Data flow diagrams, Ward & Millor Extensions, Mechanics of structured Analysis -Creating Data flow diagrams, Control flow diagram

**UNIT-IV**

Design Concepts & Principles: Design process, design Principles, design concepts-Abstraction, Refinements, Modularity, Software architecture, control hierarchy, Structural partitioning, Information hiding, Effective modular design-Functional independence, Cohesion, coupling, Design specification Outline

**UNIT - V**

Software Testing: Testing Objectives and principles, Testability, White box Testing, Black Box Testing, Control structure testing, testing for specialized environments.

Software testing Strategies - Verification and Validation, Testing strategies, Unit testing, Integration testing, Validation testing, System testing, Debugging process. Software Maintenance - Various types.

**TEXT & REFERENCE BOOK:**

- *Software Engineering- A Practitioner's Approach, Fourth Edition, By Roger S. Pressman, McGraw Hill.*



**5BCA4(B)-FUNDAMENTALS OF MATHEMATICS - IV  
(COUNTING PRINCIPLES, PROBABILITY AND STATISTICS)**

**UNIT-I**

Elementary counting principle - Product rule, Binomial and multinomial theorem, Stirling's formula, Principle of inclusion and exclusion, Permutations and combinations, Dearrangements Marriage problem.

**UNIT-II**

Recurrences and generating functions, Solution of recurrences using generating functions

**UNIT-III**

Discrete probability, Applications of counting principles to calculate discrete probability.

**UNIT-IV**

Definition of a random variable. Probability distribution and density function. Mathematical Expectation. mean, median, mode. Skewness and Kurtosis. Higher moments. Various probability distributions Normal, Binomial, Poisson, and Cauchy distributions, and their properties.

**UNIT-V**

Correlation and statistical independence. Conditional probability. Numerical generation of random variables with a given distribution Statement of the central limit theorem, and numerical test of the central limit theorem.

**UNIT-VII**

Basics of Sampling Theory Sample mean and variance. Sampling biases, with special reference, Internet sampling. Stratified sampling.

**UNIT-VII**

Introduction to Monte Carlo methods

**TEXTS & REFERENCE BOOKS :-**

- Joe.L.Mott, Abraham Kandel, T.P.Baker, "Discrete Mathematics For Computer Science And Mathematicians "
- S.S.Sastry, "Engineering Mathematics", Prentice Hall of India

**5BCA 5(A) - PROGRAMMING WITH PERL****UNIT-I**

Introduction to Perl, Working with strings & numbers, scalar data and operators, list and arrays, hashes.

**UNIT-II**

Conditions and loops, Manipulating lists and strings, pattern matching with regular expressions.

**UNIT-III**

Advanced regular expressions, creating and using subroutines, debugging perl programs.

**UNIT-IV**

Scope, modules and importing code, working with files and I/O, Using perl for CGI scripting.

**UNIT-V**

Managing files & directories, perl and the operating systems- Linux, Unix, Windows, Working with references.

**TEXT AND REFERENCE BOOK:**

- Teach yourself Perl in 21 days by Laura Lemay, SAMS Techmedia publications. ISBN-81-7635-263-2.

**5BCA5(B)- .NET TECHNOLOGY****UNIT- I**

Introduction to Component Object Model(COM), Objects and Interfaces, COM Applications, COM Clients, COM Servers.

ActiveX Control Basics, Using ActiveX Controls in Visual Basic, COM and ActiveX Interoperability.

**UNIT-II**

Introduction to .NET Framework, Understanding web programming - web browser and web server, How to create HTML pages and HTML Forms, Role of .NET in Web Development, .NET Framework and platform, base classes, XML as .NET meta language, Relation with COM, overview of CLR, .NET class Frame, An overview of .NET Components.

**UNIT-III**

Into to server-side scripting, Role of ASP.NET in Web Development How to create simple ASP.NET applications, ASP.NET vs. ASP Pages, Features of ASP.NET. Understanding, IIS and Virtual Directories, How to receive data from HTML Form - get and post method, Using server-side controls and understanding view state, Server-side event processing, Validating user input using Validation Controls, Understanding how to create user-defined control and use them, Sessions and Applications - session and application objects, Introduction to ODBC and OLEDB - managed and unmanaged providers, Accessing database using ADO.NET, connect to MSAccess, and Oracle using ADO Connection etc., Using DataSet Command, DataSet, DataTable etc., Data binding with server-side controls

**UNIT- IV**

*New object capabilities in Visual Basic, Web Interface in Visual basic,* Modern language capabilities added to Visual Basic.NET, Fitting Visual Basic into the .NET Framework, Summary of Visual Basic Language Changes, The Visual Basic Migration tool.

*ADO.NET Overview – ADO to ADO.NET, ADO.NET Capabilities.*

**UNIT-V**

Structure of a C# Program, Basic Input/Output Operations, Recommended Practices, Compiling, Running, and Debugging, Generating Extensible Markup Language (XML) documentation for a C# application.

Common Type System, Naming Variables, Using Built-in Data Types, Creating User-Defined Data Types, Converting Data Types, Using Selection Statements, Using Iteration Statements, Using Jump Statements. Handling Basic Exceptions, Raising Exceptions

**TEXTS & REFERENCE BOOKS :-**

- David Chappell **Understanding .NET**, A Tutorial and Analysis, Pearson Education India.

- Watkins, Hammond, Abrams **Programming in the .NET Environment**  
Pearson Education India.



### **5BCA9–PROFESSIONAL PERSONALITY SKILLS**

#### **UNIT-I**

##### MANAGEMENT & TECHNOLOGY

Fusion of Management and Technology

Importance of DataBase Management in Marketing and Sales Environment

#### **UNIT-II**

##### CONDENCED COMPREHENSIVE COMMUNICATION

#### **UNIT-III**

##### AWARENESS OF CURRENT AFFAIRS (PART II)

Reading of English Newspaper

#### **UNIT-IV**

##### INTERVIEW TECHNIQUES

Personal Interview Technique

Group Discussion Technique

Case Discussion Technique

Mock Sessions

### **GUIDELINES FOR INTERNAL AND CONTINUOUS ASSESSMENT**

1. Marking scheme for Major Project, Minor project, and summer assignment has already been specified in the next section.
2. Out of 100 internal marks 30 marks are reserved for practical work. These marks will be based on a record of lab-exercises work in a journal (Practical Exercise Book) maintained by the student.
3. Each practical paper of the semester should involve **at least 15 practical excercises**, (Decided by the concerned subject teacher of the study institute) which cover the entire syllabus.
4. Out of 100 internal marks 50 marks are reserved for 5 theory papers (10 marks per paper). These marks are to be awarded on the basis of at least two written tests conducted during the semester.
5. 10 marks are reserved for attendance and must be based on attendance register maintained by the teacher.
6. 10 marks are left to the discretion of the concerned teacher.
7. Practical Exercise Books, question papers and answer sheets of internal tests, and attendance records of all the students should be maintained for **at least two years** and may be inspected by the University at any time during this period.