B.C.A. SECOND YEAR
With effect from 2012-13

CODE No.	SUBJECT TITLE	TEACHING PERIODS / WEEK		MAXIMUM MARKS		TOTAL MARKS (A+B)	DURATION OF EXAM
		Theory	Practical	Theory / Practical (A)	Internal Test Marks (B)		
SEMESTER 3:							
BCA.S3.1	Computer Network	4		80	20	100	3
BCA.S3.2	Mathematical Techniques in Computer Science	4		80	20	100	3
BCA.S3.3	Database Management System	4		80	20	100	3
BCA.S3.4	Object Oriented Programming with c++	4		80	20	100	3
BCA.S3.5	Data Structures	4		80	20	100	3
BCA.S3.PR1	Comp.lab.1 (C++)		3	50		50	3
BCA.S3.PR2	Comp.lab.2 (Data Structures)		3	50		50	3
				TOTAL MARKS		600	
SEMESTER 4:							
BCA.S4.1	SOFTWARE ENGINEEING	4		80	20	100	3
BCA.S4.2	TCP/IP	4		80	20	100	3
BCA.S4.3	E-COM AND CYBER SECURITY	4		80	20	100	3
BCA.S4.4	INTRODUCTION TO RDBMS THROUGH ORACLE	4		80	20	100	3
BCA.S4.5	VISUAL BASIC	4		80	20	100	3
BCA.S4.PR1	Comp.lab.3 (VB)		3	50		50	3
BCA.S4.PR2	Comp.lab.4 (Oracle)		3	50		50	3
				TOTAL MARKS		600	

Total 2nd year Marks (3rd sem+4th Sem)=1200

BCA.S3.1-COMPUTER NETWORK

TOTAL MARKS 80 **TOTAL LECTURES 50**

Sr. No.	Topic	No. of Lect.
1.	**Data Communication Concepts** • A Communication model. • Data Communication. • Networking types:- LAN, WAN, MAN. • Types of signals: Analog & Digital. • Data encoding techniques. • Bandwidth concepts. • Channel capacity. • Synchronous and asynchronous transmission.	7
2.	**Transmission Media and Network Topology** • Magnetic media. • Twisted Pair. • Coaxial cable. • Fiber optics. • Infrared. • Microwave. • Topologies with advantages & disadvantages:-Bus, Ring, Star, Tree , Mesh.	8
3.	**Connection, Interfacing and Devices** • Connection oriented and connectionless services • Serial and Parallel connections: Half and Full Duplex operations • Modern connection and signaling • Multiplexing:- TDM, FDM	6
4.	**Network standards** • Introduction • Protocol Hierarchies • OSI reference Model • TCP/IP reference model	4
5.	**Networking basics** • Networking devices:-Repeaters, Bridges, Routers, Gateways, Hub and Switch • Protocols: - SMTP, PPP, FTP, HTTP.	10

6.	**Internet** • Internet, Intranet, Internet service providers • Internet browsers, URL and URI • E-mail, Search engines • Uploading and downloading.	5
7.	**Telephone System** • Structure of the Telephone System • The politics of telephone • The Local Loop • Narrow band ISDN • Switching techniques:- Circuit switching, packet switching, message switching.	7
8.	**Satellite communication** • Geosynchronous communication satellite • Low- orbit satellite • Satellite versus fibers	3

Suggested Readings:

1. William Stallings, "Data and Computer Communications" (Fifth Edition) Prentice-Hall of India Pvt. Ltd., New Delhi.
2. Andrew S. Tanenbaum, "Computer Networks", (Fifth Edition) Prentice-Hall of India Pvt. Ltd., New Delhi.
3. Peter Hodson, "Local Area Networks" (Third Edition), BPB Publication, New Delhi.
4. Gerd E Keiser, "Local Area Networks" Tata McGraw Hill Edition, New Delhi.

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BCA.S3.2- MATHEMATICAL TECHNIQUES IN COMPUTER SCIENCE

Total Marks: 80 **Total Lectures: 50**

Sr. No.	Topic	No. of Lect.
1.	**Introductions to Numbers and Sequences** • Natural Numbers, whole numbers, integers, rational numbers, irrational numbers, real numbers, complex numbers, prime integers. • Decimal number system • Binary number system • Sequences, types of sequences and series	5
2.	**Set Theory** • Definition and types of sets • Equal sets, subsets, universal sets, Venn diagram. • Set operations • Properties of set union and intersections. (with Venn diagrammatic proofs only)	6
3.	**Mathematical Logic** • Propositions • Logical connectives and compound statements • Truth values and truth table • Statement pattern and logical equivalence • Tautology, contradiction, contingency • Validity of arguments • Predicates	6
4.	**Matrices and Determinants** • Definition and types of matrices • Equality of Matrices and transpose of matrices • Algebra of matrices : addition, subtraction of matrices, scalar Multiplication of matrix and multiplication of matrices • Definition of Determinant • Adjoint of matrices • Inverse of matrices	8

5.	**Co-ordinate Geometry** • Introduction • Co-ordinates of a points and Quadrants • Distance between two points • Equations of straight line • Angle between two lines (without proof) • Slope of line • Parallel and perpendicular lines • Equations of circle	7
6.	**Relations and Functions of Two Variables** • Cartesian product • Relation • Function, domain, range • Types of function: into, onto, One-one, many one • Introduction to limit • Introduction to Continuity • Introduction to derivative	10
7.	**Graph Theory** • Definition and types of graphs • Incidences and degree of vertices • Isomorphism of graphs • Connected and disconnected graphs • Walks, paths and circuits • Directed graph • Tree • Centre of Tree • Binary Tree • Elementary results (Properties or Theorems) of graphs, connected graphs and Trees (Without proof)	8

Suggested Readings:

1) Elements of Discreet Mathematics by C.L. Liu
2) Discreet Mathematics by Olympia nicodemi
3) Mathematical Structures for Computer Science by Alon Doerr and k. Levasieur
4) A first step in graph theory by raghunathan, Nimkar & Solapurkar
5) Graphs theory with applications to computer science by Narsing Deo
6) Computer Fundamentals by P. K. Sinha
7) Basic Mathematics by Mittal and Agarwal

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BCA.S3.3- DATABASE MANAGEMENT SYSTEM

TOTAL MARKS: 80 **TOTAL LECTURES: 50**

Topic No.	Topic	No. of Lect.
1.	**File Structure and Organization** • Introduction • Logical and Physical Files • Basic File Operations • File Organization • Types of file organization • Overview of Indexes	8
2.	**Tree Structured Indexing** • Introduction • Index Sequential Access Method (ISAM) • B+ Tree : A Dynamic Index Structure	7
3.	**Database Management System** • Introduction, Definition of DBMS • File processing system Vs DBMS • Advantages and Disadvantages of DBMS • Users of DBMS • Capabilities of good DBMS • Overall System structure	7
4.	**Data Models** • Introduction • Data Models: 1) Object Based Logical Model, 2) Record Based Logical Model i) Relational Model ii) Network Model iii) Hierarchical Model 3) Entity Relationship Model • Entity Relationship Diagram (ERD)	8

5.	**Relational Databases** • Introduction • Terms: Relation, Tuple, Attribute, Cardinality, Degree, Domain • Keys: Super Key, Candidate Key, Primary Key, Foreign Key • Relational Algebric Operations: Select, Project, Union, Difference, Intersection, Cartesian Product, Natural Join	10
6.	**Relational Database Design** • Introduction • Anomalies of un normalized database • Normalization • Normal Form: 1NF, 2NF, 3NF	10

Suggested Readings:

1) Database System Concepts By Henry korth and A. Silberschatz

2) An Introduction to Database System by Bipin Desai

3) File Structure by Michael J. Folk, Greg, Riccardi

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BCA.S3.4-OBJECT ORIENTED PROGRAMMING WITH C++

TOTAL MARKS: 80 **TOTAL LECTURES: 50**

Sr. No.	Topic	No. of Lect.
1.	**Introduction to OOPs** • Object Oriented Programming • Basic concepts of OOPS • Benefits of OOPs.	2
2.	**Introduction to C ++:** • Tokens, Keywords, Identifiers, Constant, Data types, variables, • Scope resolution Operator, I/O statements • Structure of C++ program • Control statements, Looping statements • Type casting • Arrays, Pointer, References • Structure and Unions • Function: Call by value, Call by reference, Return by reference, Inline function, Default arguments, Function Overloading,	10
3.	**Class & Object:** • Define Class, Members, Object, Visibility modes • Static members • Pointer to members & Pointer to objects • Constructors & Destructors • Friend Function	12
4.	**Operator Overloading & Type Conversions:** • Concept of Operator Overloading: Unary & Binary operator overloading, Rules for Overloading. • Type conversions – Basic to Class, Class to basic Class to Class.	8
5.	**Inheritance & Polymorphism:** • Concept of Inheritance: Types of Inheritance • Polymorphism, Virtual, Classes, Pointer to Derived class, Virtual functions, Rules for Virtual function, Pure Virtual functions.	8

6.	**C++ I/O System:** • C++ Streams: Stream classes. • Unformatted I/O operations • Formatted I/O operations • Manipulators • Opening and closing file, file modes, Updating file.	10

Suggested Readings:

1. OBJECT ORIENTED PROGRAMMING WITH C++ by E. BALGURUSWAMI
2. OBJECT ORIENTED PROGRAMMING IN C++: by- RICHARD JOHNSON BAUGH & MARTIN KALIN
3. C++ COMPLETE REFERENCE by-– H. SHEILD

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BCA.S3.5-DATA STRUCTURES

TOTAL MARKS 80 **TOTAL LECTURES 50**

Topic No.	Topic	No. of Lect.
1.	**Introductions and Overview:** • Introduction • Basic technology, elementary data organization • Data structure • Data structure operation • Notation and Concept of algorithm • Complexity, time space tradeoff	7
2.	**Array, Records And Pointers:** • Introduction • Linear array • Representation of linear array in memory • Traversing linear array • Inserting and Deleting • Searching methods (Binary and linear search)	8
3.	**Sorting:** • Selection sort • bubble sort • insertion sort	7
4.	**Linked List:** • Introduction • Linked list • Representation of Linked list in memory • Searching a linked list • Memory allocation, Garbage collection • Insertion and deletion in linked list	8

5.	**Stacks, Queues, Recursion:** • Introduction • Stacks • Array representation of stacks • Arithmetic expression • Recursion • Queues :Memory Representation, Insertion, Deletion, Deques, priority queue	10
6.	**Tree:** • Introduction • Terminology of Binary tree • Types of Binary tree • Traversing of binary tree • Header Nodes, Threads • General Tree Introduction	10

Suggested Readings:

1. DATA STRUCTURE, BY SEYMOUR LIPSCHUTZ (SCHAUM'S OULINE SERIES INCOMPUTERS) – MCGRAW HILL.
2. AN INTRODUCTION TO DATA STRUCTURE WITH APPLICATION BY JEANPAUL, TREMBLAY PAUL, G. SORENSON (TATA MCGRAW HILL)

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BCA.S4.1 – SOFTWARE ENGINEERING

TOTAL MARKS: 80 **TOTAL LECTURES: 50**

Topic No.	Topic	No. of Lect.
1	**The Software and software Engineering:** • The Nature Of Software: Define Software, Software Applications, Legacy software • Software Engineering • The Software Process • Software Myths	5
2	**The software Process and Process Models** • A Generic Software Process Model • Process Assessment and improvement • Prescriptive Process Models: The Waterfall Model, Incremental Process Model, Evolutionary Process Model, Concurrent Model • Specialized Process Models • Personal and Team Process Model	8
3	**Agile Development** • Introduction to Agility • Agile Process • Extreme Programming(XP) • Other Agile Process Model: Adaptive Software, Development(ASD), Scrum, Dynamic System Development Method(DSDM), Crystal, Feature Driven Development(FDD), Lean Software Development(LSD), Agile Modeling(AM), Agile Unified Process(AUP)	8
4	**Understanding Requirements** • Requirement Engineering • Establishing Groundwork • Eliciting Requirements • Developing Use Cases • Building The requirement Model	5

5	**Design Concepts** • The Design Process • Design Concepts	4
6	**Quality Assurances** • Quality Concepts • Software Quality Assurance	6
7	**Risk Analysis & Management** • Software Risks • Risk Identification • Risk Projection	6
8	**Testing Techniques and strategies** • A Strategic Approach To Software Testing: Unit Testing, Integration Testing, Top-Down Integration, Bottom Up Integration • Software Testing Fundamentals • White Box Testing • Black Box Testing	8

Suggested Readings:

1. SOFTWARE ENGINEERING (A PRACTITIONER'S APPROACH) by ROGERS PRESSMAN (SEVENTH EDITION)

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BCA.S4.2-TCP/IP

TOTAL MARKS 80 **TOTAL LECTURES 50**

Topic No.	Topic	No. of Lect.
1.	**Introduction** • Internet & Internet services • I.A.B. • Two approaches to network communication • WAN & LAN • Ethernet technology	8
2.	**Internetworking Concepts & Architectural Model** • Application & Network layer interconnection • Properties of Internet & Internet architecture • Interconnection through I/P routers • Internet addresses: Universal Identifier, Addressing scheme, network direct broadcast addresses & limited broadcast • Dotted decimal notation	11
3.	**ARP** • Address resolution problem • Resolution through direct mapping & dynamic binding • Address resolution cache: cache timeout, ARP refinements, ARP implementation, ARP protocol format • ARP encapsulation & identification • RARP	11
4.	**Internet protocol** • Virtual network • Internet architecture & philosophy • Purpose of internet protocol, IPV4 • Internet datagram options • Direct & indirect delivery • UDP	10

5.	**Reliable stream transport service** • Properties • Providing reliability • Idea behind sliding window • Transmission control protocol • Ports, connections, endpoints • TCP segment format • DNS	10

Suggested Readings:

1. Internetworking with TCP/IP: Principles, protocols & architecture- By Douglos E. Comer (Pearson Education) (Volume 1. Fourth Edition)
2. Internetworking with TCP/IP: Principles, protocols & architecture- By Douglos E. Comer (Pearson Education) (Volume 1. Fifth Edition)

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BCA.S4.3- E-COM AND CYBER SECURITY

TOTAL MARKS 80 **TOTAL LECTURES 50**

Sr. No.	Topic	No. of Lect.
1	**E-Commerce:** • Electronic Commerce-Introduction. • E-Commerce Types. • Value Added Networks. • Electronic commerce over the Internet.	4
2	**Internet:** • Internet-Introduction • Internet Engineering Task Force. • Internet Architecture Board. • Internet Communication Protocols • Internet Search Tools: Telnet, FTP, World Wide Web. Gopher, HTTP. • Concerns about Internet.	7
3	**Intranet:** • Intranet • Intranet services • Intranet Implementation	4
4	**Electronic Data Interchange** • EDI introduction • Benefit: Cost & Benefits of EDI. • Components of EDI Systems: EDI Standards, EDI Softwares, EDI Communication Networks	6
5	**Identification & Tracking tools for E-commerce:** • EAN system, EAN/COM, • Article numbering system, Bar-coding, Serial Shipping Container Code & EAN label.	6

6	**Internet & Bandwidth Issues** • Bandwidth issues. • Technology issues for Internet: ATM Technology, ATM/fiber optic networks, High capacity storage systems.	6
7	**Cyber security:** • Cyber Attack • Hacking • Secure Socket Layer protocols. • Security concerns of Internet: confidentiality, Integrity, Availability, Authenticity/Non-repudiability, Auditability. • Security Solutions: Cryptography based-Symmetric & Asymmetric cryptosystem, Digital Signatures. • The IT Act. 2000.	10
8	**Electronic Payment systems & Internet Banking:** • Electronic payment systems (payment gateway, Internet banking • Secure Electronic Transaction (SET) protocol. • E-cash • Electronic Cheque • Elements of Electronic payments.	7

Suggested Readings:

1. E-commerce (The cutting Edge of Business) by Kamlesh K. bajaj and Debjani Nag. – Ist & IInd Edition (Tata McGraw Hill publication.)

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BCA.S4.4- INTRODUCTION TO RDBMS THROUGH ORACLE

TOTAL MARKS 80 **TOTAL LECTURES 50**

Sr. No.	Topic	No. of Lect.
1	**Introduction and Basic Concepts** • Structure of DBMS • Advantages and Disadvantages of DBMS • Relational Database: attributes & domains, tuples, relations and their schemes.	4
2	**Interactive SQL** • Oracle & Client-Server Technology • The Component Parts of a Two Dimensional Matrix, Data Types • DDL ,DML,DCL statements	10
3	**More on SQL** • Computations on Table Data, Oracle Dual Table, Sysdate • Oracle Functions • Data Constraints • Grouping Data from Tables, Manipulating Dates, Subqueries, joins • Study of the clauses: Union, Intersect, Minus	8
4	**SQL Performance Tuning** • Indexes • ROWID • Views • Sequences	8
5	**Introduction to Pl/SQL** • Introduction • The Generic PL/SQL Block • Oracle Transaction • Introduction to Cursor & Locks	10

6	**Introduction to Database Objects** • Stored Procedures and Functions • Database Triggers	10

Suggested Readings:

1. AN INTRODUCTION TO DATABASE SYSTEMS by BIPIN C. DESAI, (GOLGOTIA PUBLICATION)
2. SQL, PL/SQL THE PROGRAMMING LANGUAGE OF ORACLE, 2ND- By IVAN BAYROSS (BPB PUBLICATIONS)

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BCA.S4.5 – VISUAL BASIC

TOTAL MARKS: 80 **TOTAL LECTURES: 50**

Topic No.	Topics	No. of Lect.
1	**Introduction to Windows:** • What is Windows? • Elements of Windows (Pop-UP ,Menus, Main Window, Child Window, Control Panel) • Study of Important files of windows.	02
2	**VB. I.D.E.:** • VB IDE Introduction • Menu bar ,Toolbar, Project Explorer ,Property Window • Tool Box • Form layout window, Immediate Window • Project Types	03
3	**Working with Forms:** • The Anatomy of Forms • Form properties, Form Events • Form Methods (Include drawning methods) • Creating MDI Forms • Designing Menus- Menu Editor	07
4	**Visual Basic: The Language** • Data types, Keywords, Variables, Constants, Operators, I/O statements • Arrays, types, collections, Built in functions • Procedures (subroutine, functions, calling procedures) • Looping statements-Do-Loop, For-Next, While-Wend. • Control statement-If-then, If Then-Else, Select Case Statement.	12
5	**Using V.B. Controls** • Command Button-Properties, Events, methods. • Text box-Properties, Events, methods. • Label control-Properties, Events, methods. • Option button-Properties, Events, methods. • Check box-Properties, Events, methods. • Frame--Properties, Events, methods. • List box-Properties, Events, methods. • Combo box-Properties, Events, methods. • Image control -Properties, Events, methods. • Picture box-Properties, Events, methods. • Scroll box -Properties, Events, methods. • Drive list-Properties, Events, methods.	08

	• Directory list-Properties, Events, methods. • File list-Properties, Events, methods. • Timer control-Properties, Events, methods.	
6	**Database Programming with VB** • Understanding Databases & Database Management systems • Recordsets • The Data control-Properties, methods & Events of Data control. • The ADO Data control. • Introduction to-Jet Engine, ODBC, ISAM. • Procedure for loading Access data bases, oracle database. • Crystal Reports	09
7	**Object oriented programming** • Creating objects & classes • Characteristics of objects • Using object browser	05
8	**Visual Basic & Web** • Web browsing objects (Web browser control & Internet explorer object) • The properties, methods, events of Web Browser Control & the Internet Explorer Object. • Using Hyperlinks, Scripting, Document object	04

Suggested Readings:

1. Visual Basic 6 complete-BPB Publication
2. Mastering Visual Basic 6-By Evangelous Petoutscis-Sybex
3. Peter Norton's Guide to Visual Basic 6- by Peter Norton & Michael Groh. (Techmedia Publication)

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B.C.A. THIRD YEAR

With effect from 2013-14

CODE No.	SUBJECT TITLE	TEACHING PERIODS / WEEK		MAXIMUM MARKS		TOTAL MARKS (A+B)	DURATION OF EXAM
		Theory	Practical	Theory / Practical (A)	Internal Test Marks (B)		
SEMESTER 5:							
BCA.S5.1	CORE JAVA	4		80	20	100	3
BCA.S5.2	PRINCIPLES OF COMPILER DESIGNING	4		80	20	100	3
BCA.S5.3	DISTRIBUTED SYSTEMS	4		80	20	100	3
BCA.S5.4	LINUX & UNIX OPERATING SYSTEMS	4		80	20	100	3
BCA.S5.5	PROJECT WORK	4		80	20	100	3
BCA.S5.PR1	Comp.lab.1 (Java)		3	50		50	3
BCA.S5.PR2	Comp.lab.2 (Linux)		3	50		50	3
				TOTAL MARKS		600	
SEMESTER 6:							
BCA.S6.1	ADVANCE JAVA	4		80	20	100	3
BCA.S6.2	MULTIMEDIA SYSTEM	4		80	20	100	3
BCA.S6.3	COMPUTER GRAPHICS	4		80	20	100	3
BCA.S6.4	MOBILE COMMUNICATION	4		80	20	100	3
BCA.S6.5	VISUAL BASIC.NET	4		80	20	100	3
BCA.S6.PR1	Comp.lab.3 (Advance Java)		3	50		50	3
BCA.S6.PR2	Comp.lab.4 (VB.NET)		3	50		50	3
				TOTAL MARKS		600	

Total 3rd year Marks (5th sem+6th Sem)=1200

Total Marks(1st +2nd +3rd)year =3600

BCA.S5.1- CORE JAVA

TOTAL MARKS 80 **TOTAL LECTURES 50**

Topic No.	Topics	No. of Lect.
1.	**Introduction to Java** • Java history • Java features • How Java differ from C and C++ • Java program structure • Java Virtual Machine • Constants, Variables & Data types	7
2.	**Branching and Looping Statements** • Simple If statement • If… Else statement • Nested if … else statement • Switch statement , While statement, Do statement, For statement	7
3.	**Arrays, Strings, Vectors** • Arrays, Creating Arrays • One Dimensional Array, Two Dimensional Array • Strings • Vectors • Wrapper Classes	8
4.	**Classes, Objects and Methods** • Defining a class • Method declaration • Creating Objects • Accessing Class Members • Constructors • Methods Overloading • Static Members • Final variable, Final Class • Finalize Methods	9

5.	**Multithreaded Programming** • Introduction • Creating Threads, Extending the Thread Class • Stopping & Blocking a Thread • Life Cycle of thread • Thread Priorities • Synchronization	6
6.	**Interfaces & packages** • Introduction • Defining interfaces, Extending interfaces • Implementing interfaces • Java API packages • Accessing & using a package • Adding a class to a package	6
7.	**APPLET Programming** • Introduction • Preparing to Write Applets, Building Applet code • Applet Life Cycle • Applet Tag • Running Applet	7

Suggested Readings:

1. "Programming with JAVA a Primer" by E. Balguruswamy TATA McGraw Hill

2. "The Complete Reference JAVA 2" by H. Schildt

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BCA.S5.2 – PRINCIPLES OF COMPILER DESIGNING

TOTAL MARKS 80 **TOTAL LECTURES 50**

Topic No.	Topic	No. of Lect.

1.	**Introduction to Compilers** • Compilers & Translators • Need of translators • The structure of complier • Lexical analysis • Syntax analysis • Intermediate code generation • Optimization • Code generation	10
2.	**Programming languages** • High - Level programming languages • Definitions of programming languages • The Lexical & syntactic structure of a language • Data elements • Data structures • Operators • Assignment • Statements	10
3.	**Finite Automata & Lexical analysis** • The role of the lexical analyzer • A simple approach to the design of lexical analyzer • Regular expressions • Finite Automata • From regular expressions to finite automata • Minimizing the number of states of a DFA • A language for specifying lexical analyzer	8

4.	**The syntactic specification of programming languages** • Context free grammars • Derivations & parse trees • Capabilities of context-free grammars	7
5.	**Basic parsing techniques** • Parsers • Shift-reduce parsing • Operator - precedence parsing • Top-Down parsing • Predictive parsers	5
6.	**Automatic construction of efficient parsers** • LR parsers • The canonical collection of LR (0) items • Constructing SLR parsing tables • Constructing canonical LR parsing tables • Constructing LALR parsing tables • Using ambiguous grammars • An automatic parser generator • Implementation of LR parsing tables • Constructing LALR sets of items.	10

Suggested Readings:

1. Principles of Compiler Design - by Alfred V. Aho, Jeffrey D. Ullman. Narosa Publishing House ISBN-81-85015-61-9
2. Compliers, Principles. Techniques, and tools- by alfred V. Aho, Ravi Sethi, Jeffry D. Ullman ISBN-817-808-046-x

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BCA.S5.3 – DISTRIBUTED SYSTEMS

TOTAL MARKS: 80 **TOTAL LECTURES :50**

Topic No.	Topic	No. of Lect.
1.	**Introduction** • Definition of distributed system • Goals • Types of Distributed systems	6
2.	**Architectures** • Architectural styles • System Architectures: Centralized Architectures, Decentralized Architectures, Hybrid Architectures • Architectures Versus Middleware • Self-Management in Distributed systems	10
3.	**Processes** • Threads • Virtualization • Clients • Servers • Code Migration	8
4.	**Communication** • Fundamentals • Remote Procedure Call • Message oriented communication • Stream oriented communication • Multicast communication	8
5.	**Naming** • Names, Identifiers, and Addresses • Flat Naming • Structured Naming • Attribute-Based Naming	8

6.	**Synchronization** • Clock synchronization: Physical clocks, Global Positioning system, Clock synchronization Algorithms • Logical Clocks • Mutual Exclusion: Centralized Algorithm, A Decentralized Algorithm, A Distributed Algorithm, A Token Ring Algorithm. • Global Positioning of Nodes • Election Algorithms	10

Suggested Readings:

1. Distributed systems principles and Pargadigms, Second Edition- by Andrew S.Tanenbaum, Maarten Van Steen.

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BCA.S5.4 – LINUX & UNIX OPERATING SYSTEMS

TOTAL MARKS 80 **TOTAL LECTURES 50**

Topic No.	Topic	No. of Lect.
1.	**Introduction** • History of Unix • Directory structure of Unix & Linux • History of Linux • Comparison of various operating systems • Advantages of Linux, Flavors of Linux, Installation notes, Linux Loader, Linux kernel	8
2.	**File System and Devices** • File System concept ext3, ext2. • File systems: - mount, fsconf and other related commands • Adduser, alias, cat, cd, chmod, chown, chroot, cp, cpio, dc, df, dir, du, fdformat, find, finger, grep, gunzip, gv, gvim, gzip, halt, hostname, ifconfig, kill, logout, lpc, lpd, lp, rm, ls, man, mcopy, mformat, mkdir, more, mount, mt, mv, passwd, ping, ps, pwd, quota, quotaoff, rm, rmdir, route, set, shut down, sort, stat, strings, su, tar, tree, umount, unzip, vdir, vi, view, wc, who, whoami, zip.	9
3.	**Working with permissions** • Assigning file permission • Directory Permission • Using text editors • Working with vi & emacs • System services and run levels • Controlling services at boot with administration tools (chkconfig & using GUI based services)	8

4.	**System Administration** • Performing system maintenance • Communication commands :- write, wall, talk, mesg, motd, • Pre-login Message • Managing software with RPM :- Installing, Uninstalling, Upgrading • Managing users and managing Groups and managing passwords.	8
5.	**Backup strategies** • Choosing Backup Strategies and Operations • Choosing Backup hardware and media. • Using backup software and commands	8
6.	**Network configuration for Linux** • Network configuration tools • Dynamic host configuration protocol. • Network files system. • Introduction to samba • Introduction to DNS & Apache web server	9

Suggested Readings:

1 Bill Ball, David Pitts, "Red Hat Linux 7 Unleashed", Techmedia SAMS Publication

2 Evi Nemeth, Garth Snyder, Scott Seebass, Trent R. Hein, "UNIX System Administration

3 Handbook" Person Education Asia (LPE) (IIIrd Edition)

4 Red hat Linux & fedora unlashed Authors Bill Ball & Hoyt Dust.

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BCA.S5.5 – PROJECT WORK

TOTAL MARKS 80+20 **TOTAL LECTURES 40**

Guidelines for Project Work ……

1. Student can opt any programming language / software, FoxPro, C, C++, VC++, Oracle, VB, Java etc package for project work.
2. An individual or group of maximum 3 (three) students can work on single project
3. Project should strictly developed in lab and student should get it checked from guide time to time.
4. Student should get the Synopsis of project approved from guide well in advance
5. The project work should covers …….
   - Cover page
   - Certificate
   - Declaration
   - Acknowledgment
   - Index
   - Introduction of project
   - Data flow diagram
   - Source code
   - Result/output
   - Limitations
   - Conclusion
   - Bibliography

Student should submit one copy of project to the college.

For project work, there should be one external Examiner from the University & one internal Examiner from College.

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BCA.S6.1- ADVANCE JAVA

TOTAL MARKS 80 **TOTAL LECTURES 50**

Topic No.	Topic	No. of Lect.
1.	**Introduction to Java & Object Oriented Programming** • Importance of Java for Internet • Java Magic: Byte Code • Java Buzzwords • Simple program of java • Using super keyword • Dynamic method dispatch • Final class and Methods • Packages, Access Protections • Interfaces • Exception Handling Fundamentals • Working with finally clause	9
2.	**Threads and Multithreading** • Multithreading Basics • Creating and Running a Thread • The Thread control Methods • Thread life cycle • Thread Priorities • Thread synchronization	5
3.	**The Applet & Event Handling** • Applet Fundamentals • Applet Architectures • An Applet skeleton • The HTML APPLET tag • Passing parameters to Applet • Delegation based Event handling • Event class • Action Event • Window Event • Mouse Event • Key Event	9
4.	**Introduction to AWT: Working with windows, Graphics Text** • AWT Classes • Windows Fundamentals	5

	• Working with Frame window • Working with Graphics • Working with Colors & Fonts	
5.	**A Tour of Swing** • JApplet • Icons & Labels Button & Label, TextField & Buttons, • CheckBoxes, Radio buttons • Combo Box & Lists • Scroll panes • Trees • Tables • Menu Bars & Menus • Dialog Boxes • File Dialog	10
6.	**String Handling, Streams and Input/Outputs Programming** • String class • StringBuffer class • Java I/O Stream classes	4
7.	**JavaBeans** • Introduction & Advantages of JavaBeans • Application Building Tools • Bean Development Kit • JAR Files • Developing Simple Bean Using the BDK • The Java Bean API	5
8.	**Servlets** • Introduction • Life cycle of servlet • Handling HTTP Get Request • Handling HTTP Post Request	3

Suggested Readings:

1. Java The Complete Reference- by Herbert Schildt Tata McGraw-Hill

2. Mastering Java2 J2SE1.4- by John Zukouski PBP Publication

3. JavaTM How to Program sixth Edition- By H.M Deitel, P.J. Deitel

4. JAVA 2,J2SE 1.4 Complete, BPB Publication.

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BCA.S6.2- MULTIMEDIA SYSTEM

TOTAL MARKS 80 **TOTAL LECTURES 50**

Topic No.	Topic	No. of Lect.
1.	**Multimedia System** • Multimedia elements • Multimedia applications • Global structure • Evolving Technologies for Multimedia systems	5
2.	**Multimedia: Media & Data Streams** • Medium • Multimedia: media & data streams • Main properties of a multimedia system • Traditional data stream characteristics • Data stream characteristics for continuous media • Information units	6
3.	**Sound / Audio** • Basic sound concepts • Music: MDI basic concepts, MIDI devices, MIDI messages, MIDI software • Speech: Speech generation, Speech Analysis, Speech Transmission	8
4.	**Image And Graphics** • Digital Image Representation • Image Formats • Graphics Formats • Computer Image Processing: Image Synthesis, Image Analysis, Image Transmission • Image File Formats: BMP, JPEG, TIFF, PNG.	8

5.	**Video & Animation** • Basic concepts • Television (Conventional systems, Enhanced definition systems, High Definition system) • Computer based Animation	8
6.	**Data Compression** • Storage space • Coding requirements • Source Entropy & Hybrid coding • Basic compression techniques (Runlength & Huffman encoding • Introduction to following compression techniques: JPEG, H.261 (PX64), MPEG ,DVI	9
7.	**Optical Storage Media & Retrival Technologies** • Basic Technology • Video Disk & other WORMS • CD ROM • CD ROM Extended Architecture • Compact Disk Magneto optical	6

Suggested Readings:

1) MULTIMEDIA SYSTEM DESIGN

   By P. K. ANDLEIGH, KIRAN THAKRAR

2) MULTIMEDIA COMPUTING COMMUNICATION & APPLICATION

   By RALF STEINMETZ, & KLARA NASHTEDT (Pearson Education)

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BCA.S6.3 – COMPUTER GRAPHICS

TOTAL MARKS 80 **TOTAL LECTURES 50**

Topic No.	Topic	No. of Lect.
1	**Introduction to Computer Graphics** • Introduction • Advantages of computer graphics • application of computer graphics • Display devices: Cathod Ray Tubes, Color CRT monitors • Direct View Storage Tube • Plotter • Light pen • Joystick	6
2	**Raster Scan Graphics** • Line segment and line drawing algorithm • Digital differential Algorithm • Bresenham's line algorithm	6
3	**Transformation** • Two dimensional transformation • Matrix representation • Translation • Rotation • Scaling • Reflection • Shear	6
4	**Segmented Display Files** • Segment table • Functions for segmenting display file • Posting & unposting segments • Segment naming scheme • Default error conditions • Appending to segments	6

5	**Clipping & Windowing** • Viewing transformation • 2-D clipping • Simple visibility algorithm • End point codes • Midpoint subdivision algorithm • Polygon clipping algorithm (Sutherland-Hodgman algorithm) • Windowing transformation	7
6	**Display File Compilation.** • Refresh concurrent with reconstruction • Free storage allocation • Display file structure	6
7	**Geometric Models.** • Simple modeling example • Geometric modeling • Symbols & instances • Implementation of Instance transformation	6
8	**Simple Graphics Package** • Ground rules for graphics s/w design • Function domains • Graphics primitives • Windowing function • Example-a graph plotting program • Implementation of the functions • The transformation processor • The display code generator	7

Suggested Readings :

1. Principle of Interactive Computer Graphics -Willam Newman & Robert Sproull (TMH)
2. Prodedural Elements for Computer Graphics -David F. Rogers (TMH)
3. Computer graphics -A.P.Gogse

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BCA.S6.4 – MOBILE COMMUNICATION

TOTAL MARKS 80 **TOTAL LECTURES :50**

Topic No.	Topics	No. of Lect.
1	**Introduction** • Application • A Short History Of wireless Communication • A Market For Mobile Communication • Some Open Research Topic • A Simplified reference Model	8
2	**Introduction to Cellular Mobile Systems** • Introduction • Basic Cellular System • Performance Criteria • Operation of Cellular System, Planning a Cellular System • Analog Cellular System	8
3	**Medium access control** • Motivation for specialized MAC • SDMA • FDMA • TDMA • CDMA	8
4	**Telecommunication System** • GSM • DECT • TETRA	8
5	**Wireless LAN** • Infra red Vs radio transmission • Infrastructure and along Network • IEEE 802.11 • HIPERLAN • Bluetooth	9

6	**Mobile Network Layer** • Mobile IP • Dynamic Configuration Protocol • Mobile ad-hoc Networks	9

Suggested Readings:

1. Mobile Communications Second Edition – By Jochen Schiller (Pearson Education)

2. Mobile Cellular Telecommunications Second Edition-By William C.Y.Lee (Mc-Graw-Hill)

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BCA.S6.5 –VISUAL BASIC.NET

TOTAL MARKS 80 **TOTAL LECTURES 50**

Topic No.	Topic	No. of Lect.
1	**Welcome to Visual Basic.NET** • Windows versus Dos programming, Installing Visual Basic.NET ,IDE, Creating a simple Application	5
2	**The Microsoft.Net Framework:** • **.N**et framework classes, Common Language Runtime, variables, constants, operators, Data types, working with string , Methods.	5
3	**Controlling the flow:** • Making decisions, If statement, Select case, Loops.	6
4	**Working with data structures** • Understanding Arrays, understanding Enumerations, understanding constants, structures, Working with collections and Lists, Building lookup table with Hash table, Advanced array manipulation	7
5	**Building Windows Applications :** • Responding to Events, Building sample Application. creating complex application, creating the toolbars	7
6	**Displaying Dialog Boxes-** • The message Dialog Box, The open dialog control, the save dialog control, the Font Dialog control, the color dialog control, the print dialog control.	7
7	**Creating Menus** • Understanding Menu Features, creating menus, context menus.	7

8	**Debugging and Error Handling:** • Major Error types, Debugging, Error Handling	6

Suggested Readings:

1. Beginning VB.Net2003 willis, cross land and blair
2. ASP .Net and VB.Net Web Programming-Math J. Croush (pearson Edition)

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