

DEPARTMENT OF COMPUTER APPLICATION

RAJEEV GANDHI GOVT. PG COLLEGE AMBIKAPUR (C.G.)



**PROGRAM /COURSE STRUCTURE AND SYLLABUS
for
BACHELOR OF COMPUTER APPLICATION (BCA)**

SESSION - 2021-2024

Website :<http://www.rgpgcapur.in/>E-mail – rgpg.apur1960@gmail.com/Phone : 07774 – 230921

PROGRAM OUTCOMES:-

1. **Discipline knowledge :** Acquiring knowledge on basics of Computer Science and ability to apply to design principles in the development of solutions for problems of varying complexity
2. **Problem Solving:** Improved reasoning with strong mathematical ability to Identify, formulate and analyze problems related to computer science and exhibiting a sound knowledge on data structures and algorithms.
3. **Design and Development of Solutions:** Ability to design and development of algorithmic solutions to real world problems and acquiring a minimum knowledge on statistics and optimization problems. Establishing excellent skills in applying various design strategies for solving complex problems.
4. **Programming a Computer:** Exhibiting strong skills required to program a computer for various issues and problems of day-to-day applications with through knowledge on programming languages of various levels.
5. **Application Systems Knowledge:** Possessing a sound knowledge on computer application software and ability to design and develop app for applicative problems.
6. **Modern Tool Usage:** Identify, select and use a modern scientific and IT tool or technique for modeling, prediction, data analysis and solving problems in the area of Computer Science and making them mobile based application software.
7. **Industry Familiar:** Student will be able to become industry familiar.
8. **Project Management:** Practicing of existing projects and becoming independent to launch own project by identifying a gap in solutions.
9. **Ethics on Profession, Environment and Society:** Exhibiting professional ethics to maintain the integrity in a working environment and also have concern on societal impacts due to computer-based solutions for problems.
10. **Motivation to take up Higher Studies:** Inspiration to continue educations towards advanced studies on Computer Science.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Program Specific Outcome (PSOs)	
PSO1	To prepare students for career in computer science and its application in professional career.
PSO2	To develop the student to cope up with the advancements in respective science field.
PSO3	The student will determine the appropriate level of technology for use in: a) Experimental design and implementation. b) Analysis of experimental data. c) Numerical and mathematical methods in problem solutions.
PSO4	Investigate and apply mathematical problem and solution in a variety of context related to science, technology, business and industry and illustrate these solution using symbolic, numeric or graphical methods.
PSO5	Provide training to students for Programming, designing web pages, web sites-hosting/maintaining, software, database and make them familiar with computer graphics and networks.

Graduate Attributes(GA)

G1	Ability to identify a problem, analyze using design thinking techniques, and evolve innovative approaches for solving it.
G2	Ability to apply mathematical concepts and techniques in problem solving
G3	Ability to function effectively in multicultural teams to accomplish a common goal
G4	Ability to self-learn and engage in life-long learning and upgrade technical skills
G5	An understanding of professional and ethical responsibility
G6	Ability to undertake small research tasks and projects
G7	Exposure to emerging technologies such as DSA, Programming language, Cloud Technology etc.
G8	Understanding of computing systems at computer architecture, operating systems, and distributed computing levels, and how they affect the performance of software applications
G9	Ability to design and apply appropriate algorithms and data structures for evolving efficient computing based solutions for new problems
G10	Understanding of theoretical foundations, fundamental principles, and limits of computing

- BCA
- FIRST SEMESTER

FACULTY OF COMPUTER APPLICATION

Course Code	Title of Theory Paper	Theory		Internal		Practical		Project		Total	
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
BCA 101	Computer Fundamental	70	25	30	11					100	36
BCA 102	Discrete Mathematics	70	25	30	11					100	36
BCA 103	PC Software Package	50	18	25	9					75	25
BCA 104	Environmental Studies	70	25	30	11	50	18			150	55
BCA 105	F.C. Hindi	70	25	30	11					100	36
	Total Marks									375	

Dineep

Bijoy

Dra

Aless

Anubhav

Anubhav

LATA

Anish

Pooja

Ananya

Sanku

BCA
(FIRST SEMESTER)

COURSE CODE: BCA101

COURSE TITLE: COMPUTER FUNDAMENTAL

COURSE OUTCOME:

1. Acquire knowledge of basic computer technology.
2. Gain Knowledge about H/w and S/w Concepts with its technology areas.
3. Analyze & learning with MS-DOS & its basic terminology.
4. Understand the importance of windows operating system & its environment.
5. Design & Analyze the basic terminology of network, Internet, communications etc.

BCA I COMPUTER FUNDAMENTAL PO-CO Mapping					
CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓				
PO-02					
PO-03					
PO-04					
PO-05					
PO-06		✓			✓
PO-07					
PO-08					
PO-09				✓	
PO-10					

BCA (FIRST SEMESTER)	
PAPER CODE:	BCA 101
PAPER TITLE: COMPUTER FUNDAMENTAL	
MARKS:	100 THEORY: 70 CCA : 30 PRACTICAL: 00
UNIT-1 15 Hrs.	<p>Basics of Computer : Brief History of Computers, Technical Evolution of Computers, Computer Pioneers, Categories/Types of Computers, Computer Hardware, Computer Software, CPU and its components; Mother board, Microprocessor, Expansion slots, Input/output Ports, Memory; Types of Computer Memory, Memory modules viz. SIMM, DIMM, EDO, RDRAM, SDRAM, DDRAM, etc.</p>
UNIT-2 20 Hrs.	<p>Input, Hard/Soft copy Devices, Storage Devices: Input Concepts, Input Devices viz. Keyboard, Mouse, Joystick, Track Ball, Touch Screen, Light pen, MICR, OMR, OBR, OCR, Voice Input, Smart Cards, Bar Code readers, Digitizer, Scanner, etc. Graphic Display Devices: DVST, Graphical input devices, three dimensional input devices; Voice output systems. Hard copy Devices viz. Printer, Types of printers, Features of printers; Plotter, Types of plotters, Features of plotters; Soft copy devices viz VDU and it's types, Types of Cards (brief) viz. CGA, MGA/MDA, EGA, VGA, SVGA, etc. Storage devices viz. Fixed Disk or Hard Disk, Floppy Diskette, Data Retrieval and Characteristics; Optical Technology; CD-ROM, CD-ROM operation, CD-ROM standards, Origins of CD-ROM; Hard Disk Drive, Floppy disk drive, CD-Drive, DVD-Drive, Tape drive, Zip drive, Jaz Drive, Pen drive, etc.</p>
UNIT-3 20 Hrs.	<p>Operating Systems and MS-DOS: Custom made software, Pre-written software, Computer processing techniques, Functions of operating system (only list), Compiler, Assembler, Interpreter, Debugger, Loader, and Linker; Machine language, Assembly language, High level languages, Fourth generation languages; Booting process(with BIOS & POST), Auto executing programs, Setting parameters of config.sys; Internal and External commands of MS-DOS along with their syntax and different options.</p>
UNIT-4 20 Hrs	<p>Windows Operating System and Internet: Advantages, Logging on and Shutting down Windows, Start button and Task bar, Starting and Quitting a program, Opening a document, Getting help, Finding files or folders, Changing system settings, Run command, What's on your computer, Organizing files and folders, Working within documents, Saving work, Setting up a printer, Installing Software and Hardware, Copying and moving files quickly, Putting a shortcut on the Desktop, Starting programs automatically, Network neighborhood, Configuring computer to a Network, Sharing folders or printers, Using resources located on other computers, Using dial-up networking, Connecting to the Internet, Having fun, Optimizing computer, Communicating with the world, Paint, WordPad, Internet Explorer, TV viewer, Front pad, System Information utility, System file checker, Windows Tune-up Wizard.</p>

UNIT- 5 15 Hrs	Software Packages: Electronic Spreadsheet, Word processing software, other pre-written software packages, Data communication packages, Desktop publishing.
SUGGESTED READINGS	Text Books <ol style="list-style-type: none"> 1. Computer science: an overview, Brookshear, J.G., Pearson Education 2. Fundamental of Computers, Raja Raman V., Prentice Hall of India, New Delhi. 3. Introduction to Computers, Norton, Peter, , Mc-Graw-Hill. 4. Computer Fundamentals, B. Ram, New Age International Pvt. Ltd. Reference Books: <ol style="list-style-type: none"> 1. A+ Certification All-in-One Desk Reference for Dummies, Glen Clarke 2. IBM PC & Clones: Hardware Trouble Shooting and Maintenance, B. Govindarajalu, Tata McGraw Hill 3. Pc Upgrade & Repair Bible, Wiley India.

BCA
(FIRST SEMESTER)

COURSE CODE: BCA102

COURSE TITLE: DISCRETE MATHEMATICS

COURSE OUTCOME:

1. Acquire knowledge of basic mathematics.
2. Gain knowledge statements, connectives, quantifiers.
3. Analyze & learning with proposition and Boolean algebra.
4. Understand the importance of Boolean functions & its environment.
5. Design & Analyze the basic Graph theories & trees.

BCA I DISCRETE MATHEMATICS PO-CO Mapping					
CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓				
PO-02					
PO-03					
PO-04					
PO-05					
PO-06		✓			
PO-07					
PO-08					
PO-09				✓	
PO-10					

BCA (FIRST SEMESTER)	
PAPER CODE:	BCA 102
PAPER TITLE: DISCRETE MATHEMATICS	
MARKS	100
THEORY:	70
CCA :	30
PRACTICAL:	00
UNIT-1 15 Hrs.	Recall of statements and logical connectives, tautologies and contradictions, logical equivalence, algebra of propositions quantifiers, existential quantifiers and universal quantifiers.
UNIT-2 20 Hrs.	Boolean algebra and its properties, algebra of propositions as an example, De Morgan's Laws, partial order relations G.L.B., L.U.B. Algebra of electric circuits and its applications. Design of simple automatic control system.
UNIT-3 20 Hrs.	Boolean functions - disjunctive and conjugative normal forms. Boolean's expansion theorem, fundamental forms. Many terminal Networks.
UNIT-4 20 Hrs	Arbitrary Cartesian product of sets. Equivalence relations, partition of sets, injective, surjective, bijective maps, binary operations, countable, uncountable sets.
UNIT-5 15 Hrs	Basic Concept of Graph Theory, Sub graphs, Trees and their properties, Binary Trees, Spanning Trees, Directed Trees, Planar graphs, Euler Circuit, Hamiltonian Graph. Chromatic number.
SUGGESTED READINGS	<p>Text Books:</p> <ol style="list-style-type: none"> 1. Boolean Algebra and Its Applications, J. Eldon Whitesitt, Addison-Wesley. 2. A Textbook of Discrete Mathematics, Swapan Kumar Sarkar, S. Chand. 3. Discrete Math with Proof, Eric Gossett, Pearson. 4. Discrete Math Workbook: Interactive Exercises, James R Bush, Pearson. <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Discrete Mathematics, Prof. H K Pathak, Shiksha Sahitya Prakashan 2. Discrete Maths, C.L.Liu, T McGraw Hill

BCA
(FIRST SEMESTER)

COURSE CODE: BCA103

COURSE TITLE: PC SOFTWARE PACKAGE

COURSE OUTCOME:

1. Acquire knowledge of basic windows operating system.
2. Gain Knowledge while working with MS-Word along with its tools.
3. Analyze & learning with MS-Excel and its applications.
4. Understand the importance of MS-PowerPoint with setting templates and views.
5. Design & Analyze the interactive PowerPoint presentation using all its animations. etc.

BCA I Subject : PC SOFTWARE PACKAGE PO-CO Mapping					
CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓				
PO-02					
PO-03					
PO-04					
PO-05					
PO-06		✓	✓		
PO-07					
PO-08					✓
PO-09					
PO-10					

BCA
(**FIRST SEMESTER**)

PAPER CODE: BCA 103

PAPER TITLE: PC SOFTWARE PACKAGE

MARKS: 75 THEORY: 50 CCA : 25 PRACTICAL: 00

UNIT-1 15 Hrs.	<p>WINDOWS 7 : Installing WINDOWS, Basic Elements of WINDOWS, My Computer, Sharing Devices. Windows Explorer (Files and Folder Operations), Accessories like Accessibility, Entertainment, Communication, System Tools, Paint Brush, Calculator, Calendar, Clock, Note Pad, Word Pad Etc., Control Panel, Changing Color and Theme, Changing the Desktop Background, Screen Saver, Adjusting Display Settings, Adjusting Sound, Adjusting the Mouse, Changing the Date and Time, Changing Language and Region Options, Customizing Folder View Options, Connecting to the Internet: Dial-Up Connections, Broadband Connections, Installing New Hardware & Printer, Installing & Removing Software, Power Settings.</p>
UNIT-2 20 Hrs.	<p>Introduction to MS Word : Menus, Shortcuts, Document types; Working with Documents: Opening Files - New & Existing, Saving Files, Formatting page and Setting Margins, Converting files to different formats- Importing, Exporting, Sending files to others, Editing text documents- Inserting, Deleting, Cut, Copy, paste, Undo, Redo, Find, Search, Replace, Using Tool bars, Ruler- Using Icons, Using help; Formatting Documents: Setting Font Styles, Setting Paragraph style, Setting Page Style, Setting Document Styles, Creating Tables, Drawing, Tools, Printing Documents, Mail Merge.</p>
UNIT-3 20 Hrs.	<p>Introduction to MS Power Point : Creating new Presentation, Different presentation templates, Setting backgrounds, Selecting presentation layouts, Formatting a presentation-Adding style, Color, gradient fills, Arranging objects, Adding Header & Footer, Slide Background, Slide layout, Inserting pictures, movies, tables etc. into the presentation, Drawing Pictures using Draw, Setting Animation & transition effect, Adding audio and video, Printing Handouts. Generating standalone presentation viewer.</p>
UNIT-4 20 Hrs	<p>Introduction to MS Excel : Introduction: Spreadsheet & its Applications, Opening spreadsheet, Menus & Toolbars & icons, Shortcuts, Working with Spreadsheets-Opening, Saving Files, Setting Margins, Converting files to different formats- Importing, Exporting and Sending files to others. Entering and Editing Data, Computing data: Formula. Formatting Spreadsheets- Cell, row, column & Sheet, Alignment, Font, Border & shading. Highlighting values, Hiding/Locking Cells: Worksheet- Sheet Name, Row & Column Headers, Row Height, Column Width and Worksheet Sheet Formatting & style background, Graphs, Printing worksheet.</p>
UNIT-5 15 Hrs	<p>Introduction MS Access : Database concepts Tables, Queries, Forms, Reports, Opening & Saving database files: Creating Tables, Table Design, Indexing, Entering data, Importing data, Creating Queries: SQL statements, Setting relationship, Creating Forms: GUI, Form, Creating & printing reports.</p>

**SUGGESTED
READINGS**

Text Books:

1. Comdex Computer Course Kit (windows 7 with office 2010), Gupta Vikas. Dreamtech Publication.
2. Mastering MS Office 2000, Professional Edition by Courier, BPB Publication
3. MS Office 2000 Training Guide by Maria, BPB Publications
4. MS Office complete by SYBEX.

- **BCA**
- **SECOND SEMESTER**

Course Code	Course (Paper/Subjects)	Theory Marks		Internal Marks		Practical Marks		Project Marks		Total	
		Max.	Min.	Max.	Min.	Min.	Max.	Min.	Max.	Min.	Max.
BCA 201	Programming Methodology and C Programming	50	18	25	09	-	-	-	-	75	27
BCA 202	Operating System	70	25	30	11	-	-	-	-	100	36
BCA 203	Concept of Software	70	25	30	11	-	-	-	-	100	36
BCA 204	Bridge Course	70	25	30	11	-	-	-	-	100	36
BCA 205	F.C. English	70	25	30	11	-	-	-	-	100	36
BCA 206	LAB Work	-	-	-	-	50	18	-	-	50	18
	Total Marks									425	

L. Arif

B. Arif
Arif

Arif

Arif

Arif

Arif

Arif

Arif

Arif

**BCA
(SECOND SEMESTER)**

COURSE CODE: BCA201

COURSE TITLE: PROGRAMMING METHODOLOGY AND C PROGRAMMING

COURSE OUTCOME:

1. Acquire knowledge of basic computer programming language.
2. Gain Knowledge about Procedural Oriented Programming Language.
3. Analyze & learning with C-Programming & its basic terminology.
4. Understand the importance of Array, Functions, Pointer and String.
5. Understand the implementation of Control Structure.

BCA II PROGRAMMING METHODOLOGY AND C PROGRAMMING PO-CO Mapping					
CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓				
PO-02			✓		
PO-03					
PO-04					
PO-05					
PO-06		✓			✓
PO-07					
PO-08					
PO-09					
PO-10					

BCA
(SECOND SEMESTER)

PAPER CODE: BCA 201

PAPER TITLE: PROGRAMMING METHODOLOGY AND C PROGRAMMING

MARKS: 75 THEORY: 50 CCA : 25 PRACTICAL :

SCHEME OF MARKS:

- Objective Type Questions: 08 Questions Carrying 1 Marks Each To Be Asked.
- Short Answer Type Questions: 03 Questions Carrying 2 Marks Each To Be Asked. (Word Limits 70-100 Words).
- Middle Answer Type Questions: 04 Questions Carrying 3 Marks Each To Be Asked. (Word Limit 200-250).
- Long Answer Type Questions: 03 Questions Carrying 08 Marks Each To Be Asked. (Word Limit 500-600 Words).

UNIT-1 15 Hrs.	<p>C Programming Concepts : History of C language, C Language Character set. Tokens, Constant, Keywords and Identifiers, Variables Data Types Declaration and Assignment of Variables, Defining Symbolic Constants, Operators and Expressions: Types of Operators- Arithmetic, Relational and Logical Operators, Assignment and Conditional Operators Increment & Decrement Operators, Bitwise and Special Operators, Arithmetic Expression and its evaluation, Hierarchy of Arithmetic Operations- Evaluations, Precedence and Associativity- Mathematical Functions, Library functions: getchar(), putchar(), printf(), scanf(), puts(), gets ().</p>
UNIT-2 20 Hrs.	<p>Control and Branch Handling : Flow of control - if, if-else, while, do-while, for loop, Nested control structures - Switch, break and continue go to statements, Comma operator, The ? : Operators, Functions -Definition - prototypes - Passing arguments - Recursion- Storage Classes - Automatic, External, Static, Register Variables, Storage Classes and Character Strings: Automatic, Register, Static, External (Local and Global), Scope rules.</p>
UNIT-3 20 Hrs.	<p>Arrays, String, Structures and Unions in C : Arrays - Defining and Processing, Single, Two Dimensional and Multi-dimensional arrays. Passing arrays to functions, Arrays and Strings, Handling of Character Set: Declaration & Initialization of String Variables, Structures and Unions: Definitions, Initialization and Assigning Values to Members, Arrays of Structures and Arrays Within Structures, Structure with in Structure, Unions- Size of Structures.</p>
UNIT-4 20 Hrs	<p>Functions and Pointers : User Defined Functions: Form of "C" functions- Calling a Function - Nesting of Functions - Recursion - Functions with Arrays, Pointers: Declaration and Initialisation of Pointers, Pointer Expression, Operation on Pointers, Pointer and Arrays, Arrays of Pointers, Pointer and Character Strings, Pointers and Functions, Pointers and Structures, Pointer on Pointers.</p>
UNIT- 5 15 Hrs	<p>File Maintenance in C : File Input/Output: Introduction, Defining, Opening and closing a file, Study of file I/O Operations: fopen (), fclose (), fputs (), fgets (), fread (), fwriteQ, Input / Output Operations on a file, Random access to file, Command line arguments, Time, Date and Localization Functions, Dynamic Allocation Functions, Utility Functions, Wide-Character Functions.</p>

Text Books:

1. LET US C, Yashwant Kanetkar, BPB PUBLICATIONS
2. The Complete Reference C, Herbert Schildt, Tata McGraw HILL
3. PROGRAMMING IN ANSI C - by E. Balgurusamy - Tata McGraw HILL
4. PROGRAMMING WITH C. Byron Govtfred, Tata McGraw HILL

Reference Books:

1. The "C" Programming Language, Brian W. Kenigham & Dennis Ritchie, Pearson
2. The Spirit of "C"- Henry Mulish, Herbert L. Cooper.
3. Mastering "C" - Crain Bolon.

BCA
(SECOND SEMESTER)

COURSE CODE: BCA202

COURSE TITLE: OPERATING SYSTEM

COURSE OUTCOME:

1. Acquire basic knowledge of Operating System and its types.
2. Gain Knowledge about Process management.
3. Analyze & learning with Memory management & its basic terminology.
4. Understand the importance of Storage Device.
5. Understand the implementation of Operating System architecture.

BCA II OPERATING SYSTEM PO-CO Mapping					
CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓				
PO-02					✓
PO-03		✓			
PO-04					
PO-05					
PO-06			✓		
PO-07					
PO-08					
PO-09					
PO-10					

BCA
(SECOND SEMESTER)

PAPER CODE: BCA 202

PAPER TITLE: OPERATING SYSTEM

MARKS: 100 THEORY: 70 CCA : 30 PRACTICAL: 00

SCHEME OF MARKS:

- Objective Type Questions: 08 Questions Carrying 1 Marks Each To Be Asked.
- Short Answer Type Questions: 03 Questions Carrying 2 Marks Each To Be Asked. (Word Limits 70-100 Words).
- Middle Answer Type Questions: 04 Questions Carrying 3 Marks Each To Be Asked. (Word Limit 200-250).
- Long Answer Type Questions: 03 Questions Carrying 08 Marks Each To Be Asked. (Word Limit 500-600 Words).

UNIT-1 15 Hrs.	<p>Introduction to Operating System : What is an Operating System, Operating Systems Architecture, Operating Systems as an Extended Machine & Resource Manager, Process Model, Process States and Transitions, Types of System Calls, System Boot, Multi-Programming, Multi-Tasking, Multi-Threading; Operating Systems Classification: Simple Batch Systems, Multi-programmed Batches systems, Time-Sharing Systems, Parallel & Distributed Operating Systems.</p>
UNIT-2 20 Hrs.	<p>Process Management : Processes: Process Scheduling, Cooperating Processes, Inter-process Communication, Threads, CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple- Processor Scheduling, Process Synchronization: Background, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors, Deadlocks: Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Recovery from Deadlock, Combined Approach to Deadlock Handling.</p>
UNIT-3 20 Hrs.	<p>Memory Management : Main Memory Management: Background, Logical versus Physical Address space, swapping, Contiguous allocation, Paging, Segmentation, Segmentation with Paging, Virtual Memory: Demand Paging, Page Replacement, Page replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Demand Segmentation.</p>
UNIT-4 20 Hrs	<p>Device and Storage Management : File-System Interface, Mass-Storage Structure, Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Buffering, Multiple Paths, Secondary-Storage Structure: Disk Structure, Disk Scheduling, Disk Management.</p>
UNIT- 5 15 Hrs	<p>File-System Implementation : A Simple File System, Logical & Physical File System, File-System Interface: Access Methods, Directory Structure, Protection, Free-Space Management, Directory Implementation.</p>

**SUGGESTED
READINGS**

Text Books:

1. Operating System Concepts, Silberschatz and Galvin, Pearson Education Pub.
2. Operating Systems, Madnick E., Donovan J., Tata McGraw Hill,
3. Operating Systems, A. S. Tannenbaum, PHI

Reference Books:

1. Operating Systems Internals and Design Principle, William Stallings, Prentice Hall Publishers
2. Operating Systems- AConcept-Based Approach, Dhananjay M. Dhamdhere, McGraw- Hill

**BCA
(SECOND SEMESTER)**

COURSE CODE: BCA203

COURSE TITLE: CONCEPT OF SOFTWARE

COURSE OUTCOME:

1. Acquire basic knowledge of software's & its category.
2. Gain Knowledge about H/w and S/w Concepts with its technology areas.
3. Analyze & learning with System Software.
4. Understand the importance of Assembler, Microprocessor & its environment.
5. Understand the implementation of Linkage & Loader.

**BCA II
CONCEPT OF SOFTWARE
PO-CO Mapping**

CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓				
PO-02					
PO-03					
PO-04					
PO-05			✓		
PO-06					
PO-07					
PO-08					
PO-09				✓	
PO-10					

BCA
(SECOND SEMESTER)

PAPER CODE: BCA 203

PAPER TITLE: CONCEPT OF SOFTWARE

MARKS: 100 THEORY: 70 CCA : 30 PRACTICAL: 00

SCHEME OF MARKS:

- Objective Type Questions: 08 Questions Carrying 1 Marks Each To Be Asked.
- Short Answer Type Questions: 03 Questions Carrying 2 Marks Each To Be Asked. (Word Limits 70-100 Words).
- Middle Answer Type Questions: 04 Questions Carrying 3 Marks Each To Be Asked. (Word Limit 200-250).
- Long Answer Type Questions: 03 Questions Carrying 08 Marks Each To Be Asked. (Word Limit 500-600 Words).

UNIT-1 15 Hrs.	<p>Category of Software with example and brief features :</p> <p>Introduction to Software (s/w), Types of s/w: Application Software & System Software, Various Application Software s/w and their examples: Word Processing s/w, Spreadsheet s/w, Database s/w, Presentation s/w, Business s/w Suite, Project Management s/w, Personal Information Manager s/w, Business s/w for Phones, Accounting s/w, Document Management s/w, Enterprise Computing s/w; Graphics and Multimedia s/w, Computer-Aided Design s/w, Desktop Publishing s/w, Image Editing s/w, Video and Audio Editing s/w, Multimedia Authoring s/w, Web Page Authoring s/w; Software for Home, Personal, and Educational Use: Personal Finance s/w, Legal s/w, Tax Preparation s/w, Home Design/Landscaping s/w, Travel and Mapping s/w, Reference and Educational s/w, Entertainment s/w, Web Applications s/w, Application Software for Communications.</p>
UNIT-2 20 Hrs.	<p>System Software :</p> <p>System Programming and System Programs, Needs of System Software, BIOS, POST sequence, Concept & introduction to various system s/w such as: Assemblers, Loaders, linkers ,macro processors, Macros, Compilers, Interpreters, Operating system and formula system, Translators and its types, Editor, Simulator, Emulator, Debugger, Device Drivers, Firmware.</p>
UNIT-3 20 Hrs.	<p>Assemblers and Macro processors :</p> <p>Assemblers: Structure of assembler, Overview of the assembly process, Basic function, Machine dependent and machine independent features of assembler, Types of assemblers - single pass, multi-pass, cross assembler, Macros & Macro processors: Macro definition and examples, Basic Macro Processor Functions, Machine Independent Macro Processor Features, Concept of Parameterized Macro, Nested Macros, Conditional Macro Expansion, and Recursive Macro. Symbolic debugger.</p>
UNIT-4 20 Hrs	<p>Loaders and Linkage Editors :</p> <p>Basic Loader Functions, Linking and Concept of Static & Dynamic Relocation, Various loader schemes with their advantages and disadvantages, Other loader schemes - binders, Linking loaders, Dynamic binders, Machine dependent & Machine Independent Loader Features, Interpreters: use of interpreter, pure and impure interpreter.</p>
UNIT-5 15 Hrs	<p>Compilers :</p> <p>Introduction to Compilers, Phases of a Compiler, Comparison of Compilers & Interpreters, Machine dependent & Machine Independent Compiler Features, Aspects of Compilation, Lexical Analysis, Syntax Analysis, Memory Allocation, Compilation of Expressions; Code optimization - local and global optimization, Study of LEX & YACC.</p>

Text Books:

1. System Programming- J. J. Donovan, Tata McGraw-Hill Education.
2. System Programming and Operating systems- D. M. Dhamdhere, Tata McGraw-Hill
3. System Software: An introduction to systems programming- Leland L. Beck, Pearson Education
4. Principles of Compiler Design-Aho and Ullman, Pearson Education.

Reference Books:

1. Compiling Techniques, J P Bennett, TMH .
2. Modern Compiler Design, Dick Grune, Koen G.L, Henri Bal, Wiley India.
3. Compiler Construction, Principles and Practice, Kenneth C. Louden; Cengage Learning

BCA (SECOND SEMESTER)	
PAPER CODE:	BCA 204
PAPER TITLE : BRIDGE COURSE	
MARKS:	100 THEORY: 70 CCA : 30 PRACTICAL: 00
SCHEME OF MARKS:	
<ul style="list-style-type: none"> • Objective Type Questions: 08 Questions Carrying 1 Marks Each To Be Asked. • Short Answer Type Questions: 03 Questions Carrying 2 Marks Each To Be Asked. (Word Limits 70-100 Words). • Middle Answer Type Questions: 04 Questions Carrying 3 Marks Each To Be Asked. (Word Limit 200-250). • Long Answer Type Questions: 03 Questions Carrying 08 Marks Each To Be Asked. (Word Limit 500-600 Words). 	
UNIT-1 15 Hrs.	Algebra : Partial fractions, Arithmetic Progression & Geometric Progression. Determinants and matrices, Inverse matrix.
UNIT-2 20 Hrs.	Process Management: Permutation Combination, Method Of Induction, Binomial Theorem For Positive Integral Index And Any Index (Without Proof), Exponential And Logarithmic Series.
UNIT-3 20 Hrs.	Trigonometry: Measurement Of Angles, Trigonometric Rations, Sample Formula Compound Angles, Trigonometric Rations Of Multiple And Sub Multiple Angles. Height And Distance, Inverse Function.
UNIT-4 20 Hrs	Geometry: Locus, Cartesian Coordinate System, Distance Formula, Section Formula, Slope Of A Straight Line Various Forms, Angle Between Two Lines, Pair Of Straight Lines, Parabola, Ellipse And Hyperbola.
UNIT- 5 15 Hrs	Statistics : Frequency, Distribution, Measures Of Central Tendency, Mean. Median, Mode, G.M., H.M., Inter Quartile Range, Mean Deviation, Standard Deviation.
SUGGESTED READINGS	Text Books: <ol style="list-style-type: none"> 1. Mathematics (Class XI and XII) - R.D. Sharma 2. Youghodh Mathematics - Class XI and Class XII

BCA
(SECOND SEMESTER)

PAPER CODE: BCA 201

PAPER TITLE: COMPUTER LAB – I (PC Software & Programming In C Language)

MARKS: 50 THEORY: 00 CCA : 00 PRACTICAL: 50

Group A
LIST OF EXPERIMENTS

1. How to change the background of Desktop.
2. How to change the Date and Time of computer.
3. How you create table in MS-Word.
4. Create your own Biodata in MS-Word and Save the file in your folder.
5. Type 3 paragraphs and use paragraph setting with line spacing.
6. Create one page admission form in MS-Word.
7. Create table in Ms-word

Car		Price
Maruti	Omni Van	200000
	Maruti 800	240000
Tata	Sumo	390000
	Sierra	447700

8. Create table student in MS-Excel

Student

R.No.	Name	Class	Percentage	Result
101	Aarti	BCA	75.5	First Div
102	Shivani	BCA	72.3	First Div
103	Nisha	BCA	62.5	First
104	Preeti	BCA	59.1	Sec Div
105	Shikha	BCA	65	First Div

- Find the max percentage
- Count the No. of students

9. Make PowerPoint presentation using 4 slides, insert picture, tables on your own topic.
10. Make PowerPoint presentation using 4 slides, set header footer, use custom animations and slide transition.

11. Create Employee database in MS-Access

Eid	Ename	Eadd	Esal	Econtact
101	Aarti	Bsp	10000	9039818462
102	Shivani	Rai	12000	9396542415
103	Nisha	Bsp	15000	9632457899
104	Preeti	Bsp	10000	9993804525
105	Shikha	Rai	13000	9876523145

- insert five records in table
- Set Eid as a primary key

12. Create Student Form in MS-Access using the following labels –

RollNo

Name

FName

DOB

Address

Result

13. Do the following in MS-Word

- Create Table.
- Insert Picture.
- Type one para and apply font style, size and color.

14. Do the following in MS-Excel

- Find the total using function.
- Find the average.
- Find max and min value.
- Insert the column.

15. Create bar graph for the below table –

Result

Year	Pass	Fail
2010-11	45	05
2011-12	46	04
2012-13	44	06
2013-14	48	02
2014-15	47	03

Group B
LIST OF EXPERIMENTS

1. Program to Find area and circumference of circle.
2. Program to Find the Simple interest.
3. Program to Find Convert Temperature form degree centigrade to Fahrenheit.
4. Program to Find Calculate sum of 5 subjects & find percentage.
5. Program to Show swap of two no's without using third variable.
6. Program to reverse a given number.
7. Program to print a table of any numbers.
8. Program to find greatest in 3 numbers.
9. Program to show the use of conditional operator.
10. Program to find that entered year is leap year. Or not.
11. Program to find whether given no is even or odd.
12. Program to shift input data by two bits to the left.
13. Program to use switch statement, Display Monday to Sunday.
14. Program to display arithmetic operator using switch case.
15. Program to display first 10 natural no & their sum.
16. Program to print Fibonacci series up to 100.
17. Program to find GCD &HCF of given Numbers using Recursion.
18. Program to find whether gives no is a prime no or net.
19. Program to display sum of Series $1+1/2+1/3+\dots+7/n$.
20. Program to display series and find sum of $1+3+5+\dots+n$.
21. Program to use bitwise AND operator between the two integers.
22. Program to add two number using pointer.
23. Program to find sum, subtraction, multiplication & Transpose of matrices .
24. Program to reverse a number using the pointer .
25. Program to show input and output of a string.
26. Program to find square of a number using functions.
27. Program to swap two numbers using of function.
28. Program to find factorial of a number using functions.
29. Program to show table of a number using functions.
30. Program to show call by value. Program to show call by reference.
31. Program to find largest of two number using functions.

- BCA
- THIRD SEMESTER

Course Code	Course (Paper/Subjects)	Theory Marks		Internal Marks		Practical Marks		Project Marks		Total	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
BCA 301	Digital Electronics and Microprocessor	70	25	30	11	-	-	-	-	100	36
BCA 302	Computer Networks	70	25	30	11	-	-	-	-	100	36
BCA 303	Data Structure	50	18	25	09	-	-	-	-	75	27
BCA 304	F.C. Hindi	70	25	30	11					100	36
	Total Marks									375	

L. Arora

Anshu

Pooja

D. S.

P. Mishra

S. Singh

S. Singh

S. Anshu

A. Singh

**BCA
(THIRD SEMESTER)**

COURSE CODE: BCA301

COURSE TITLE: DIGITAL ELECTRONICS AND MIRCROPROCESSOR

COURSE OUTCOME:

1. Acquire knowledge of basic digital signal and numbering system.
2. Gain Knowledge about Logic gates and their families.
3. Analyze & learning with theorems and Boolean algebra.
4. Understand the importance of truth table and Boolean expression.
5. Understand the implementation combinational and sequential circuit.

BCA III DIGITAL ELECTRONICS AND MICROPROCESSOR PO-CO Mapping					
CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓				
PO-02					
PO-03			✓		
PO-04					
PO-05					
PO-06					
PO-07					
PO-08					
PO-09					
PO-10					✓

BCA (THIRD SEMESTER)	
PAPER CODE: BCA 301	
PAPER TITLE: DIGITAL ELECTRONICS AND MICROPROCESSOR	
MARKS: 100 THEORY: 70 CCA : 30 PRACTICAL: 00	
UNIT-1 15 Hrs.	Background of Digital Electronics : Digital Signals, Different Type of Numbering System: Decimal, Octal, Binary, Hexadecimal, Conversation from One Number System to Another System, Binary Addition, Binary Subtraction, Binary Complements. One's & Two's Complement, Binary Subtraction Using Two's Complement.
UNIT-2 20 Hrs.	Logic Families : Logic Gate Basics: Or gate AND Gate, NOT Gate, Exclusive-OR (XOR) Gate, Truth Tables for Logic Gates, Truth Tables for Combinational Logic. Types of Logic Family: Circuit of RTL, DTL, TTL and Working Function as a Gate, Emitter Coupled Logic (ECL) CMOS Logic Family, NMOS and PMOS Logic, Comparison of Different Logic Families.
UNIT-3 20 Hrs.	Boolean Algebra and Karnaugh Maps : Boolean Algebra, Boolean Expression Of Combinational Logic, Laws of Boolean Algebra, Rule a of Boolean Algebra: NOT Rule, OR Rules, AND Rules, XOR Rules, Derivation of other rules Simplification, Demorgan's Theorem, Boolean Expression Formats: Sum-Of- Product, Product-Of-Sum, Converting SOP & POS to Truth Table & Truth Table to Expression, Karnaugh Maps.
UNIT-4 20 Hrs	Combinational and Sequential Circuit : Decoders, Multiplexers, De-Multiplexers, State Machine Design Process: Mealy Versus Moore State Machines, S-R Latch/ Flip-Flop, D Latch, J-K Flip-Flop, Divide-By-Two Circuit, Registers, Counter Ripple (Asynchronous) Counter and Synchronous Counter, UP/DOWN Counters.
UNIT-5 15 Hrs	Microprocessor : Generic Architecture of Microprocessor, Pin Diagram & Pin Function of Intel 8085 Microprocessor, Instructions Set for Microprocessor, Definition and need of Addressing Mode, Addressing Modes of Intel 8085 & 8086 Microprocessor, Machine Cycle and Instruction Cycle of Microprocessor, Working of Microprocessor.

Text Books

1. Modern Digital Electronics, R. P. Jain, TMH
2. Digital Principles & Application, Leach & Malvino, TMH
3. Digital Logic Design, Morris Mano, PHI
4. Microprocessor – Architecture, Programming and Applications with the 8085, Ramesh S. Gaonkar.

Reference Books:

1. Digital Integrated Electronics, H. Taub & D. Shilling, McGraw Hill
2. Digital Principles & Design, Givone, TMH
3. Digital Circuit & Design, S. Aligahanan, S. Aribazhangan, Bikas Publishing House.
4. Fundamental of Digital Electronics & Microprocessor, Anokh Singh, A. K. Chhabra, S. Chand

BCA
(THIRD SEMESTER)

COURSE CODE: BCA302

COURSE TITLE: COMPUTER NETWORKS

COURSE OUTCOME:

6. Acquire knowledge of basic computer network.
7. Gain Knowledge about TCP/IP Model.
8. Analyze & learning with different layers of network.
9. Understand the importance of computer network architecture.
10. Understand the implementation of computer network protocols.

BCA III COMPUTER NETWORKS PO-CO Mapping					
CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓				
PO-02					
PO-03			✓		
PO-04					
PO-05					
PO-06					
PO-07					
PO-08					
PO-09					
PO-10					✓

BCA (THIRD SEMESTER)	
PAPER CODE:	BCA 302
PAPER TITLE:	COMPUTER NETWORKS
MARKS:	100 THEORY: 70 CCA : 30 PRACTICAL: 00
UNIT-1 15 Hrs.	Introduction to Computer Network : Computer Network Fundamental and types of Computer Network LAN, MAN, WAN, Wireless and Wired Network Broadcast and Point to Point Network, Network Topologies, ISO-OSI Reference Model, TCP/IP Model.
UNIT-2 20 Hrs.	Data Link Layer : Functions at Data Link Layer, Framing and Correction Codes: Checksum, CRC, Hamming Code, Flow Control: Stop & Wait and Sliding Window Protocols, Data Link Protocols: HDLC and PPP, Medium Access Sub-Layer, LLC Protocol, IEEE Overview of IEEE 802.2, 802.3, 802.5 802.6.
UNIT-3 20 Hrs.	Network Layer and Transport Layer : Functions of Network Layer, Routing Protocols & Algorithms, Principles of Congestion Control, Ipv4 Address, Ipv4 Addressing, Ipv6 Address, Internetworking Basics, Functions of Transport Layer, Flow Control & Buffering, Introduction To TCP/UDP Protocols and their Comparison.
UNIT-4 20 Hrs	Common Network Architecture : Connection Oriented & Connectionless N/Ws, Frame Relay, Example of N/Ws-P2p, X.25, ATM Ethernet, Wireless LANS – 802.11, 802.11x, Gigabit, Broad Band Networks: Integrated Service Digital Networks (ISDN), Broad Band ISDN, ATM, Very Small Aperture Terminal(VSAT).
UNIT-5 15 Hrs	Internet and Protocols World Wide Web (WWW), Domain Name System (DNS), E-Mail, File Transfer Protocol (FTP), Hyper Text Transfer Protocol (HTTP), E-Mail Protocols: Mime & SMTP, POP, IMAP, Telnet – Remote Communication Protocol, Proxy Server, Proxy Web Servers: Internet Class Full Addressing, Working Of Internet Applications.
SUGGESTED READINGS	Text Books: <ol style="list-style-type: none"> 1. Computer Networks, Andrew S. Tanenbaum, PHI / Pearson Education Inc. 2. Data communication and Networking, Behrouz A. Forouzan, Tata McGraw-Hill. 3. Internet Law-Text and Materials, chris Reed, universal law Publishing co., new delhi Reference Books: <ol style="list-style-type: none"> 1. Data and computer communication, William stallings, pearson education. 2. Computer and communication networks, nader F. Mir, Pearson Education, 2007. 3. Data & computer communication, black, PHI.

**BCA
(THIRD SEMESTER)**

COURSE CODE: BCA303

COURSE TITLE: DATA STRUCTURE

COURSE OUTCOME:

1. Acquire knowledge of basic data structure.
2. Gain knowledge about algorithm & its operation.
3. Analyze & learning with various types of searching sorting techniques.
4. Understand the importance of algorithms.
5. Understand the implementation of different data structure and techniques using its operations.

BCA III DATA STRUCTURE PO-CO Mapping					
CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01					
PO-02	✓				
PO-03				✓	
PO-04					
PO-05					
PO-06					
PO-07					
PO-08					
PO-09					
PO-10					✓

BCA (THIRD SEMESTER)	
PAPER CODE:	BCA 303
PAPER TITLE:	DATA STRUCTURE
MARKS: 75	THEORY: 50 CCA : 25 PRACTICAL: 00
UNIT-1 15 Hrs.	Introduction and Array : Data Types, Data Structure and its Classification, Arrays: Array concept (one dimension, two dimension), Operations for one dimension array (insertion, deletion, traversal), Examples.
UNIT-2 20 Hrs.	Linked Lists : Concept of a linked list, Circular & Doubly linked list, Operations on linked lists, List Manipulation with Pointers, Insertion & Deletion of elements, Applications of linked lists.
UNIT-3 20 Hrs.	Stacks-Queues and Binary Tree : Definitions and Structure, Representation using Array & Linked List, Application of Stack and Queues, Postfix and Prefix Conversion, Evolution of Arithmetic Expressions, Binary Trees: Definition, Memory Representation, Trees traversal algorithms (recursive and non-recursive), threaded trees, BFS, DFS.
UNIT-4 20 Hrs	Searching and Sorting : Linear and Binary Search Algorithms, Complexity, Binary Search Trees (construction, insertion, deletion & search), Sorting Algorithms: Bubble Sort, Insertion Sort, Selection Sort, Tree sort, Heap Sort, Quick Sort, Merge Sort & Radix sort, External Sorting.
UNIT- 5 15 Hrs	Analysis of Algorithm : Time and Space Complexity of Algorithms, Average Case & Worst Case Analysis, Asymptotic Notation, Big O notations, Analysis of sorting algorithms -Selection sort, Bubble sort, Insertion sort, Heap sort, Quick sort and Analysis of searching algorithms -Linear Search & Binary Search.
SUGGESTED READINGS	Text Books: <ol style="list-style-type: none"> 1. Data Structures using C, A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub. 2. Data Structures using C by A. K. Sharma, Pearson Education 3. Data Structures and Algorithms, A.V. Aho, J.E Hopcroft and T.D. Ullman, Addison- Wesley, Low Priced Edition. 4. Fundamentals of Data structures, Ellis Horowitz & Sartaj Sahni, AW Pub. 5. Fundamentals of computer algorithms, Horowitz Sahni and Rajasekaran, Pearson Edu.

- **BCA**
- **FOURTH SEMESTER**

Course Code	Course (Paper/Subjects)	Theory Marks		Internal Marks		Practical Marks		Project Marks		Total	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
BCA 401	Object Oriented Programming using C++	50	18	25	09	25	09	-	-	75	27
BCA 402	Computer Graphics and Multimedia	70	25	30	11	-	-	-	-	100	36
BCA 403	Computer Organization and Architecture	70	25	30	11	-	-	-	-	100	36
BCA 404	F.C. English	70	25	30	11	-	-	-	-	100	36
BCA 405	Lab Work	-	-	-	-	50	18	-	-	50	18
	Total Marks									425	

L. Ariz

Anitha

Poige

Dm

P. Anishya

S. Anup

S. Anup

S. Anubhav

A. Anshu

**BCA
(FOURTH SEMESTER)**

COURSE CODE: BCA401

COURSE TYPE : DISCIPLINE SPECIFIC CORE

COURSE

COURSE TITLE: OBJECT ORIENTED PROGRAMMING USING C++

COURSE OUTCOME:

1. Acquire knowledge of basic computer programming language.
2. Gain Knowledge about Object Oriented Programming Language.
3. Analyze & learning with C++ Programming & its basic terminology.
4. Understand the importance of Data binding, functions and creating objects.
5. Understand the implementing concept of overloading and operator.

**BCA IV
OBJECT ORIENTED PROGRAMMIN USING C++
PO-CO Mapping**

CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓				
PO-02					
PO-03					
PO-04		✓	✓		
PO-05					
PO-06					
PO-07					
PO-08					
PO-09					
PO-10					✓

BCA (FOURTH SEMESTER)	
PAPER CODE: BCA 401	
PAPER TITLE: OBJECT ORIENTED PROGRAMMING USING C++	
MARKS: 75	THEORY: 50
CCA : 25	PRACTICAL: 00
UNIT-1 15 Hrs.	Features of C++, OOP vs. procedure-oriented programming, OOP Concepts: Abstraction, Inheritance, Polymorphism, Data Binding, Encapsulation, Classes, subclasses and Objects; Basics of C++: Data Types and sizes, Variable, Constants and its types, Use of « and » operators, Operators and Expressions: Operators:-Arithmetic, Relational, Assignment, Logical, Increment and Decrement Operators (++ and --), Operate-Assign' Operators, Expressions, Operator Precedence, Precedence and Order of Evaluation, Conditional Expression, Casting and type conversion.
UNIT-2 20 Hrs.	Program Flow & Decision Control: if, if - else, if - else if, Loop Control: while, do - while, for, break, continue, Case Control: switch, goto; Functions/Procedures, Returning values from functions, Arguments Passed by Value, Passing Addresses of Arguments, Pointers and Arrays: Pointer Initialization, Pointer Operators, Pointer Arithmetic, Functions and pointers, Arrays, Initializing Arrays, Passing Arrays to Functions, Pointers and Arrays, Pointer to an Array, Array of pointers, Strings: String I/O, Arrays of Strings, Structures, Arrays of Structures.
UNIT-3 20 Hrs.	Binding Data & Functions: Defining a Class, Creating an Object, Scope, Data Abstraction, Data Encapsulation, 'this' Pointer, Dynamic Creation of Objects, Constructors and Destructors: Parameterized & Copy constructor, Member Functions & Methods, Friend Class and Friendly Functions, Returning Objects, Arrays of Objects.
UNIT-4 20 Hrs	Function and Operator Overloading, Rules for Overloading, Operator overloading and its uses: Overloading unary and binary operators, Overloading the Assignment Operator, Overloading the « Operator, Overloading the Increment & Decrement Operator, Converting data types: Basic to class type, Class to Basic Type, Class to Another Class Type.
UNIT-5 15 Hrs	Reusing Classes: Inheritance-Base and Derived classes, Inheritance types, Scope Resolution Operator, Access Modifiers, Multiple & Multilevel Inheritance, Calling Base Class Constructor, Overriding Base Class Members, Virtual functions and Polymorphism: Virtual & non-virtual Overriding, Rules for Virtual Functions, Pure Virtual Functions, Static and Dynamic Binding, Virtual Base Classes, Templates, Exception Handling, Throwing an exception.
SUGGESTED READINGS	<p>Text Books:</p> <ol style="list-style-type: none"> 1. C++, The Complete Reference, 4th Edition, Herbert Schildt, TMH. 2. Object Oriented Programming in C++, 4th Edition, R.Lafore, SAMS, Pearson Education <p>Reference Books:</p> <ol style="list-style-type: none"> 1. An Introduction to OOP, 3rd Edition, T. Budd, Pearson Education,2008. 2. Programming Principles and Practice Using C++, B.Stroutstrup, Addison- Wesley, Pearson Education. 3. Problem solving with C++, 6th Edition, Walter Savitch, Pearson Education,2007.

**BCA
(FOURTH SEMESTER)**

COURSE CODE: BCA402

COURSE TITLE: COMPUTER GRAPHICS AND MULTIMEDIA

COURSE OUTCOME:

1. Acquire knowledge of basic computer graphics and multimedia tools.
2. Gain Knowledge about Graphics software and algorithms.
3. Analyze & learning with 2-D & 3-D transformation with its basic terminology.
4. Understand the importance of multimedia and Photoshop software.
5. Understand the implementation of CorelDraw with its tools.

BCA IV COMPUTER GDRAPHICS AND MULTIMEDIA PO-CO Mapping					
CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓				
PO-02		✓			
PO-03					
PO-04					
PO-05					
PO-06			✓		✓
PO-07					
PO-08					
PO-09					
PO-10					

BCA (FOURTH SEMESTER)	
PAPER CODE:	BCA 402
PAPER TITLE: COMPUTER GRAPHICS AND MULTIMEDIA	
MARKS:	100 THEORY: 70 CCA : 30 PRACTICAL: 00
UNIT-1 15 Hrs.	An Introduction Graphics System : Computer Graphics Fundamentals, Application of Computer Graphics, Video Display Devices. Raster & Random Scan Systems, Input Devices, Graphics Software, Interactive devices, Output Primitives, Line Drawing & Circle Generating Algorithms, Scan-Line Polygon Fill Algorithm, Inside-Outside tests, Boundary-Fill Algorithm, Flood Fill Algorithm.
UNIT-2 20 Hrs.	2D Transformations : Viewing and Clipping: Viewing Transformations, Point Clipping & Line Clipping Algorithms, Polygon Clipping algorithms, 2D Geometric Transformations: Basic transformations (Translation, Rotation, Scaling), Matrix Representation & Homogeneous Coordinates, Composite transformations, Reflection and Shear.
UNIT-3 20 Hrs.	3D Transformations : 3D Viewing Transformation, Projections: Parallel Projection (Orthographic & Oblique Projections, Isometric Projections), Perspective Projections, 3D Geometric Transformations: Translation, Rotation, Scaling, Matrix Representation, 3D Object Representations: Polygon Surface and Polygon table, Bezier curves and surfaces.
UNIT-4 20 Hrs	Multimedia and Photoshop s/w : Fundamentals of Multimedia, Adobe Photoshop CS4: Menus and panels, Exploring the Toolbox, Working with Images: Working with Multiple Images, Rulers, Guides & Grids, Image Size Command, Adjusting Canvas Size & Canvas Rotation, Creating, Selecting, Linking & Deleting Layers, Painting with Selections, Red Eye Tool, Clone Stamp Tool, Color creation, Quick Mask Options, Creating Straight & Curved Paths, Creating Special Effects.
UNIT-5 15 Hrs	CorelDraw X4 : CorelDraw X4 Command Bars & Tools, Drawing Area-Objects-Lines, Working with Text & Artistic Media Tool, Fills & Modifying Outlines, Drop Shadows, Importing and Editing OCR Text, Templates, Drawing and Editing Curves and Lines, Three-point Tools, Clipart, Special Characters and Creating Symbols, Working with Layers & Creating a Master Layer, Brush Tools and Adding Objects, Interactive Tools, Power Clip Feature and the Envelope Tool.
SUGGESTED READINGS	<p>Text Books:</p> <ol style="list-style-type: none"> 1. Procedural Elements for Computer Graphics, D.F. Rogers, Tata McGraw Hill 2. Fundamentals of Interactive Computer Graphics, J.D. Foley and A.D. Van, Addison- Wesley. 3. How to Do Everything Adobe Photoshop CS4, Chad Perkins, Tata McGraw Hil 4. Corel Draw X4: The Official Guide, (Paperback), Gary David Bouton, Tata McGraw Hill <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Mathematical Elements for Computer Graphics,, Rogers and Adam, Tata McGraw Hill. 2. Theory & Problem of Computer Graphics, Plastock, Schaum Series. 3. Computer Graphics, Tosijas, L.K., Springer-verleg 4. Principles of Interactive Computer Graphics, Newman, Tata McGraw Hill.

**BCA
(FOURTH SEMESTER)**

COURSE CODE: BCA403

COURSE TYPE : DISCIPLINE SPECIFIC CORE COURSE

COURSE TITLE: COMPUTER ORGANISATION AND ARCHITECTURE

COURSE OUTCOME:

1. Acquire knowledge of basic computer organization and architecture.
2. Gain Knowledge about pipeline and memory hierarchy.
3. Analyze & learning with Parallel Computer Models & Program parallelism.
4. Understand the importance of Synchronous parallel processing.
5. Understand the implementation of System Interconnection.

<p align="center">BCA IV COMPUTER ORGANIZATION AND ARCHITECTURE PO-CO Mapping</p>						
CO	PO	CO-01	CO-02	CO-03	CO-04	CO-05
	PO-01	✓				
	PO-02					
	PO-03		✓			✓
	PO-04					
	PO-05					
	PO-06					
	PO-07					
	PO-08					
	PO-09					
	PO-10					

BCA
(FOURTH SEMESTER)

PAPER CODE: BCA 403

PAPER TITLE: COMPUTER ORGANIZATION AND ARCHITECTURE

MARKS: 100 THEORY: 70 CCA : 30 PRACTICAL: 00

UNIT-1 15 Hrs.	<p>Pipeline: Linear: pipeline processor, Non linear pipeline processor, Instruction pipeline design, Mechanisms, Dynamic instruction scheduling, Arithmetic pipeline design, Super-scalar processors, VLIW architecture.</p>
UNIT-2 20 Hrs.	<p>Memory Hierarchy and I/O Organization On: Cache memories, Cache coherence, High bandwidth memories, high bandwidth I/O, Disk I/O, Bus specifications and standards.</p>
UNIT-3 20 Hrs.	<p>Parallel Computer Models & Program parallelism: Classification of Machines, SISD, SIMD & MIMD, Condition of parallelism, data and resource Dependencies, Program partitioning & scheduling, grain size latency, control flow versus data control, data flow architecture.</p>
UNIT-4 20 Hrs	<p>Synchronous Parallel Processing: Vector instruction types, vector access memory schemes, vector and symbolic processors, SIMD architecture, SIMD parallel algorithms, SIMD computers and performance enhancements.</p>
UNIT-5 15 Hrs	<p>System Interconnection: Network properties and routing, static interconnection networks, dynamic interconnection networks, Multiprocessor system interconnection, Multistage & combining networks.</p>
SUGGESTED READINGS	<p>Text Books:</p> <ol style="list-style-type: none"> 1. Flynn Computer Architecture: Pipelined and parallel processor design, JB, Boston. 2. Computer Architecture & Parallel processing - Kai Hwang 7 Briggs. (MGH). 3. Computer System Architecture, M. Morris Mano, PHI/Pearson Education. 4. Computer Organization, C Hamacher, Z Vranesic, SafwatZaky, McGraw Hill. 5. Computer Architecture and Organization, J. P. Hayes, Tata McGraw-Hill. <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Parallel Computer Arch.& Algo, R.W. Hockney, C.R. Jesshope, Adam Hilger. 2. Structured Computer Organization, A. S. Tanenbaum, Pearson Education. 3. Fundamentals of Computer Organization, P. Dandamudi , Springer.

BCA
(FOURTH SEMESTER)

PAPER CODE: BCA 404

PAPER TITLE: COMPUTER LAB – I PROGRAMMING IN C++

MARKS: 50 THEORY: 00 CCA : 00 PRACTICAL: 50

LIST OF EXPERIMENTS

1. Write a C++ program to find the sum of individual digits of a positive integer.
2. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
3. Write a C++ program to generate the first n terms of the sequence.
4. Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
5. Write C++ programs that use both recursive and non-recursive functions
 - To find the factorial of a given integer,
 - To find the GCD of two given integers,
 - To find the nth Fibonacci number.
6. Write a C++ program that uses a recursive function for solving Towers of Hanoi problem.
7. Write a C++ program to find both the largest and smallest number in a list of integers.
8. Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:
 - Reading a matrix,
 - Printing a matrix,
 - Addition of matrices
 - Subtraction of matrices.
 - Multiplication of matrices.
9. Write a program to demonstrate concept of method overloading.
10. Write a program to demonstrate concept of inheritance.
11. Write a program to demonstrate concept of operator overloading.
12. Write a program to demonstrate concept of virtual and pure virtual function.
13. Write a program to demonstrate concept of polymorphism.
14. Write a program to demonstrate concept of friend function and friend class.

BCA

(**FOURTH SEMESTER**)

PAPER CODE: BCA 405

PAPER TITLE: COMPUTER LAB – II DATA STRUCTURE

MARKS: 50 THEORY: 00 CCA : 00 PRACTICAL: 50

LIST OF EXPERIMENTS

1. Design a program in C for addition of five numbers using single dimension array.
2. Design a program in C for swapping of two numbers.
3. Design a program in C for addition using two 2X2 matrix .
4. Design a program in C for simple Structure.
5. Design a program in C for generating Fibonacci Series.
6. Design a program in C for generating Even series.
7. Design a program in C for multiplication of two 3X3 Matrix.
8. Design a program in C for Bubble sorting .
9. Design a program in C for Linear Search.
10. Design a program in C for Insertion Sort.
11. Design a program in C for Merge Sort.
12. Design a program in C for Quick Sort.
13. Design a program in C for Binary Search.
14. Design a program in C for Union.
15. Design a program in C for user defined function for addition of two numbers

- **BCA**
- **FIFTH SEMESTER**

Course Code	Course (Paper/Subjects)	Theory Marks		Internal Marks		Practical Marks		Project Marks		Total	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
BCA 501	Database Design and RDBMS	50	18	25	09	25	09	-	-	75	27
BCA 502	Software Engineering and Project Management	70	25	30	11	-	-	-	-	100	36
BCA 503	Numerical Analysis	70	25	30	11	-	-	-	-	100	36
BCA 504	Introduction to AI and Expert System	70	25	30	11	-	-	-	-	100	36
BCA 505	F.C. Hindi	70	25	30	11	-	-	-	-	100	36
	Total Marks									475	

L.A.

Anita

Pooja

D.

P. Singh

S. Singh

S. Singh

S. Subhav

A. Singh

**BCA
(FIFTH SEMESTER)**

COURSE CODE: BCA501

COURSE TITLE: DATABASE DESIGN AND RDBMS

COURSE OUTCOME:

1. Acquire knowledge of basic Database design and RDBMS.
2. Gain Knowledge about Relational Model.
3. Analyze & learning with Database design concept.
4. Understand the importance of Normal forms.
5. Understand the implementation of Transaction Processing techniques.

**BCA V
DATABASE DESIGN AND RDBMS
PO-CO Mapping**

CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓	✓			
PO-02					
PO-03					
PO-04					
PO-05					
PO-06					
PO-07					
PO-08					
PO-09					
PO-10					✓

BCA
(FIFTH SEMESTER)

PAPER CODE: BCA 501

PAPER TITLE: DATABASE DESIGN AND RDBMS

MARKS: 75 THEORY: 50 CCA : 25 PRACTICAL: 00

UNIT-1 15 Hrs.	<p>Introduction to DBMS : Data & Information, File systems versus Database systems, Data Models, Schemas and Instances, Data Abstraction, Data Independence, Database languages and Interfaces, DBMS Architecture, Data Independence, Database Characteristics: Data modeling using Entity - Relationship (ER) Model: Entity sets, attributes and keys, Relationship types, sets, roles and structural constraints, Weak Entity types. Data Models: Relational, Network, Hierarchical and Object Oriented, Enhanced E-R Modeling.</p>
UNIT-2 20 Hrs.	<p>Relational Model and RDBMS : Relational data model concepts, Codd's 12 rules, Relational model constraints and schemas, Relational Algebra and Relational calculus, Relational database design by ER & EER to Relational Mapping, Overview & Architecture of commercial RDBMSs: Oracle, SQL Server. My SQL etc., Database Language: SQL, SQL Programming Techniques: DDL, DML, DCL query statements, Constraints and Triggers, Views and Indexes, SQL in Server Environment.</p>
UNIT-3 20 Hrs.	<p>Database Design Concepts : Data dependency, Armstrong's Axioms, Functional dependencies and Normalization of Relational Databases, First, Second and Third Normal forms, Boyce-Codd Normal form (BCNF), Relational Database design Algorithms and further dependencies, De-normalization.</p>
UNIT-4 20 Hrs	<p>Transaction Processing : ACID Properties of Transactions, Concurrency control, Serializability and Recoverability, Transaction support in SQL, Locking Techniques. Time Stamp ordering, Validation Techniques, Granularity of Data Items, Database recovery techniques - Shadow paging, Log Based Recovery, ARIES recovery algorithm, Database Security: Access control, Statistical Database Security, Deadlock: Detection, Avoidance and Recovery.</p>
UNIT-5 15 Hrs	<p>Special Purpose Databases : Semi-structured Data Model, OO Data Model, OODBMS, Object-Based Databases, Object Relational Databases: XML and Web Databases, Structure of XML, Temporal Databases, Distributed Databases, Deductive Databases, Mobile Databases, Multimedia Databases, GIS Databases, Spatial Databases.</p>

Text Books:

1. Fundamentals of Database Systems, R Elmasri & S B. Navathe, Pearson Education.
2. Database Systems Concepts, A Silberschatz, H F. Korth & S. Sudarshan, McGraw-Hill.
3. Fundamentals of Database Management Systems, Mark L. Gillenson, Wiley India Pvt.
4. Introduction To Database Systems, C.J.Date, Longman, Pearson Education

Reference Books:

1. Database Systems: A Complete Book, Molina, Ullman, J. Widom, Pearson Education.
2. Database Systems: Design, Implementation, and Management, Peter Rob & Carlos Coronel, CENGAGE Learning India Pvt. Ltd., New Delhi.
3. Database Systems Using Oracle, Nilesh Shah, PHI Learning Pvt. Ltd., New Delhi.
4. Database Management Systems, R Ramakrishnan, J Gehrke, McGraw-Hill Education
5. Database Development and Management, Lee Chao, Auerbach Publications

BCA
(FIFTH SEMESTER)

COURSE CODE: BCA502

COURSE TITLE : SOFTWARE ENGINEERING

COURSE OUTCOME:

1. Acquire knowledge of basic Software Engineering and process model.
2. Gain Knowledge about Design Engineering and requirements.
3. Analyze & learning with Architectural design, pattern & its basic terminology.
4. Understand the importance of testing strategies and matrices.
5. Understand the implementation of Testing & techniques.

BCA V
SOFTWARE ENGINEERING
PO-CO Mapping

CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓	✓			
PO-02					
PO-03					
PO-04					
PO-05					
PO-06			✓		✓
PO-07					
PO-08					
PO-09					
PO-10					

BCA (FIFTH SEMESTER)	
PAPER CODE:	BCA 502
PAPER TITLE:	SOFTWARE ENGINEERING AND PROJECT MANAGEMENT
MARKS:	100 THEORY: 70 CCA : 30 PRACTICAL: 00
UNIT-1 15 Hrs.	Software Engineering and Process models : Software myths, Software engineering- A layered technology, Software Development Life Cycle, Process models: waterfall model, Incremental process models, Evolutionary process models, The Unified process; Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, software requirements document.
UNIT-2 20 Hrs.	Requirements and Design Engineering : Feasibility studies, Requirements elicitation and analysis, Requirements . validation, Requirements management, System models: Context Models, Behavioral models, Data models, Object models, Design concepts, the design model, software architecture, Data design, Architectural styles and patterns, Architectural Design.
UNIT-3 20 Hrs.	Testing Strategies and Product metrics : A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging, Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.
UNIT-4 20 Hrs	Plans for testing: Snooping for information, Coping with complexity through teaming, Testing plan focus areas, Testing for recoverability, Planning for troubles, Preparing for the tests: Software Reuse, Developing good test programs , Data corruption, Tools, Test Execution .Testing with a virtual computer, Simulation and Prototypes, Managing the Test, Customer's role in testing.
UNIT-5 15 Hrs	Software Project Management : Evolution of Software Economics, Life Cycle Phases and Process artifacts, Model based software architectures, Software process workflows, quality indicators, life-cycle expectations, CCPDS-R Case Study and Future Software Project Management Practices

Text Books:

1. Fundamentals of Software Engineering, Rajib Mall, PHI Learning Pvt. Ltd.
2. Software Engineering, Ian Sommerville, Pearson Education Inc., New Delhi.
3. Software Engineering: A Practitioner's Approach. Roger S. Pressman, Tata McGraw-Hill
4. Software Project Management, Walker Royce, Pearson Education.

Reference Books:

1. Software Engineering, Shari L, Joanne M. Atlee, Pearson Education, Inc. New Delhi.
2. Software Engineering, Pankaj Jalote, Wiley India Pvt. Ltd., New Delhi.
3. Software Engineering, Dines Bjorner, Springer India Pvt. Ltd . New Delhi
4. Managing the Software Process, Watts S. Humphrey, Pearson Education.
5. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH.
6. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly.

BCA
(FIFTH SEMESTER)

COURSE CODE: BCA503

COURSE TITLE : NUMERICAL ANALYSIS

COURSE OUTCOME:

1. Acquire basic knowledge of algebraic expression.
2. Gain Knowledge about methods, equations and matrix.
3. Analyze & learning with interpolation & its basic functions.
4. Understand the importance of numerical integration and differentiation.
5. Understand the implementation of differential equation & successive approximations.

BCA V
NUMERICAL ANALYSIS
PO-CO Mapping

CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓				
PO-02		✓			
PO-03					
PO-04					
PO-05					
PO-06					
PO-07					
PO-08					✓
PO-09					
PO-10					

BCA
(**FIFTH SEMESTER**)

PAPER CODE: BCA 503

PAPER TITLE: NUMERICAL ANALYSIS

MARKS: 100 THEORY: 70 CCA : 30 PRACTICAL: 00

UNIT-1 15 Hrs.	Solution of Polynomial and Transcendental Algebraic Equations : Bisection method, Regula falsi method & Newton Raphson Method, Secant Method, Iteration Method, Solution of Cubic & Biquadratic Equation.
UNIT-2 20 Hrs.	Simultaneous Equations and Matrix: Gauss -Elimination Method, Gauss -Gordon Method and Pivoting, Gauss Seidel Iterative Method, Reduction to lower or upper Triangular forms , Inversion of matrix , method of partitioning , Characteristics equation of matrix , Power methods , Eigen values of matrix , Transformation to diagonal forms.
UNIT-3 20 Hrs.	Interpolation - Single Variable Functions: Newton's Interpolation formula, Newton's Forward and Backward Difference Interpolation Formula, Langrange's Interpolation formula, Newton's Divided Difference Interpolation Formula.
UNIT-4 20 Hrs	Numerical Differentiation and Integration: Newton - cotes integration formula, Trapezoidal Rule, Simpson's One-Third and Three- Eight Rule, Waddle's Rule.
UNIT-5 15 Hrs	Numerical Solution of Ordinary Differential and Integral Equation: Numerical Solution of first order Ordinary Differential Equations, one step method, Euler's, Picard's and Taylor's series Methods, Picard's Methods for successive approximations, Runga-Kutta Method.
SUGGESTED READINGS	Text Books 1. Numerical methods, B.S. Garewal, 2. Introduction to Numerical Methods, S. Shastri, TMH. 3. Numerical methods for Science and Engineering, Jain M.K.

BCA
(FIFTH SEMESTER)

COURSE CODE: BCA503

COURSE TITLE: INTRODUCTION TO AI AND EXPERT SYSTEM

COURSE OUTCOME:

1. Acquire overview of basic Artificial Intelligence.
2. Gain Knowledge about problem solving and search strategies.
3. Analyze & learning with structured knowledge & its basic terminology.
4. Understand the importance of knowledge representation.
5. Understand the implementation of Learning, Planning and Perception.

BCA V
INTRODUCTION TO AI AND EXPERT SYSTEM
PO-CO Mapping

CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓	✓			
PO-02					
PO-03			✓		
PO-04					
PO-05					
PO-06					
PO-07					
PO-08					
PO-09					
PO-10					✓

BCA
(FIFTH SEMESTER)

PAPER CODE: BCA 504

PAPER TITLE: INTRODUCTION TO AI AND EXPERT SYSTEM

MARKS: 100 THEORY: 70 CCA : 30 PRACTICAL: 00

UNIT-1 15 Hrs.	<p>Overview of Artificial Intelligence : Definition & Importance of AI, Intelligent Agents: Agents & Environments, Emergence of Intelligent Agents, PEAS Representation for an Agent, Types of Agents; Knowledge: General Concepts: Introduction, Definition and Importance of Knowledge, Knowledge-Based Systems and Representation of Knowledge, Knowledge Organization, Knowledge Manipulation and Acquisition of Knowledge.</p>
UNIT-2 20 Hrs.	<p>Problem Solving and Search Strategies : Solving Problems by Searching, Examples of Search Problems, Problem Formulation, Uninformed Search Techniques- DFS, BFS, Iterative Deepening, Comparing Different Techniques, Informed search methods - heuristic Functions, Hill Climbing, Simulated Annealing, A*, Searching And-Or Graphs, Constrained Satisfaction Problems: Various CSP problems, map, Coloring, Crypt Arithmetic, Backtracking for CSP, Local Search, Adversarial Search: Games, Minimax Algorithm, Alpha Beta pruning.</p>
UNIT-3 20 Hrs.	<p>Knowledge Representation, Reasoning and Structured Know ledge Syntax and Semantics for Propositional logic, Syntax and Semantics for FOPL, Properties of Wffs, Unification, Forward and backward chaining, Conversion to Clausal Form, Inference Structured Knowledge: Graphs, Semantic Net. Associative Networks, Frames, Frame Structures, Conceptual Dependencies and Scripts.</p>
UNIT-4 20 Hrs	<p>Learning and Planning Learning from Observations, General Model of Learning Agents, Inductive learning, learning Decision Trees, Introduction to neural networks, Perceptrons, Multilayer feed forward network, Application of ANN, Planning problem, Planning with State Space Search, Partial Order Planning, Hierarchical Planning, Conditional Planning.</p>
UNIT- 5 15 Hrs	<p>Expert Systems Architectures Introduction, Rule Based System Architecture. Non-Production System Architecture, Dealing with uncertainty. Knowledge Acquisition and Validation, Knowledge System Building Tools.</p>

Text Books:

1. Artificial Intelligence: A Modern Approach, S Russell & P Norvig, Pearson Publication
2. Principles of Artificial Intelligence, Nils J. Nilsson, Narosa Publication.
3. Introduction to Artificial Intelligence and Expert System, Dan W. Patterson.PHI.
4. Artificial Intelligence, Elaine Rich, Kevin Knight, Tata McGraw Hill.

Reference Books:

1. AI-Structures & Strategies for Complex Problem Solving, G Lugar. Pearson Educations
2. Artificial Intelligence: an Engineering approach, Robert J Schalkolf, McGraw Hill.
3. Artificial Intelligence, Patrick H Winston, 3rd edition, Pearson Educations
4. Decision Support Systems and Intelligent Systems, Efraim Turban Jay E.Aronson. PHI.
5. Artificial Intelligence-A System Approach, M.Tim Jones, Infinity Science Press
6. Artificial Intelligence - Strategies, Applications, and Models through Search, Christopher Thornton and Benedict du Boulay, New Age International Publications.

- **BCA**
- **SIXTH SEMESTER**

Course Code	Course (Paper/Subjects)	Theory Marks		Internal Marks		Practical Marks		Project Marks		Total	
		Max.	Min.	Max.	Min.	Min.	Max.	Min.	Max.	Min.	Max.
BCA 601	.Net Technology	50	18	25	09	25	09	-	-	75	27
BCA 602	Data Mining and Warehousing	70	25	30	11	-	-	-	-	100	36
BCA 603	Network Security and Cyber Technology	70	25	30	11	-	-	-	-	100	36
BCA 604	F.C. Hindi	70	25	30	11	-	-	-	-	100	36
BCA 605	Lab Work	-	-	-	-	50	18	-	-	50	18
BCA 606	Major Project	-	-	-	-	100	36	-	-	100	36
	Total Marks									525	

L.A.

Kultha

Poige

Dm

P. Mishra

S. Singh

S. Singh

S. Subhav

A. Singh

**BCA
(SIXTH SEMESTER)**

COURSE CODE: BCA601

COURSE TITLE: .NET TECHNOLOGY

COURSE OUTCOME:

1. Acquire basic knowledge of dot net programming language.
2. Gain knowledge about data control and dot net framework.
3. Analyze & learning with ASP.Net & its basic terminology.
4. Understand the importance of database linking with languages.
5. Understand the implementation of navigation control & validation.

**BCA VI
.NET TECHNOLOGY
PO-CO Mapping**

CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01		✓			
PO-02					
PO-03					
PO-04	✓			✓	
PO-05					
PO-06					
PO-07					
PO-08					✓
PO-09					
PO-10					

BCA
(SIXTH SEMESTER)

PAPER CODE: BCA 601

PAPER TITLE: – .NET TECHNOLOGY

MARKS: 75 THEORY: 70 CCA : 30 PRACTICAL: 00

UNIT-1 15 Hrs.	<p>Programming with C#.net : Getting Started with Net Framework, Exploring Visual Studio NET, Inside a C# Program, Data Types, Statements, Arrays, Using Strings. Objects, Classes and Structs, Properties, Inheritance, Indexers, Delegates, Events. Namespaces, Generics, Collections and Data Structures. Exception Handling. Threading, Using Streams and Files, Reflection, Assemblies, versioning, Windows Forms, Controls, Data binding to Controls, Advanced Database Programming using ADO.net, Using GDI +, Networking, net Removing, Manipulating XML.</p>
UNIT-2 20 Hrs.	<p>Programming with VB.net : Creating Applications with Visual Basic.NET, Variables, Constants, and Calculations, Making Decisions and Working with Strings, Lists. Loops, Validation, Sub Procedures and Functions Multiple Forms. Standard Modules, and Menus, Arrays, Timers, Form Controls. File Handling, Exception Handling, Working with Databases, Advanced Database Programming using ADO.net. Classes, Generics, Collections, Inheritance, Custom Controls, Crystal Reports.</p>
UNIT-3 20 Hrs.	<p>Programming with ASP.net: Building a Web Application, Examples Using Standard Controls, Using HTML Controls, Validating Form Input Controls using Validation Controls, Understanding Applications and Site, Applying Styles, Themes, and Skins, Creating a Layout Using Master Pages, Binding to Databases using Controls, Data Management with ADO.net , Creating a Site Navigation Hierarchy, Navigation Controls , Membership and Role Management, Login Controls, Securing Applications, Caching For Performance, XML, Using Crystal Reports in Web Forms.</p>
UNIT-4 20 Hrs	<p>Database and .NET Technology : Data Access with LINQ to SQL : Automatic Properties, Initializers, Understanding type inference/lamda exp/generics/anonymous types, Creating LINQ to SQL Entities, Performing standard database commands with LINQ to SQL, Creating a custom LINQ entity Base Class, Standard Data-access operation, Performing Validation; Navigation Controls: Understanding Site Maps, SiteMapPath Control, Formatting the SiteMapPath Control, Menu Control, Login Control: Automatically Redirecting a user to the Referring Page, Automatically Hiding the Login Control from Authinticated Users, Authenticated Users, Caching Application Pages and Data, Manipulating the Page Output Profiles, Localizing Applications for multiple languages, Forms- Based Authentication with the web.cofig file- with an xml file-with a database table.</p>
UNIT-5 15 Hrs	<p>Advanced Applications with .NET Technology XML Web Services: Setting Web Method Attribute, Setting Web Services Attribute, Invoking an XML Web Service with HTTP-Get, HTTP-Post & SOAP, XML Web Services Behavior, AJAX(Asynchronous JavaScript and XML): Server Side & Client Side Ajax, Ajax Toolkit, Setting up and implementing Ajax, SQL Server Administration: Setup Database server of a website, Converting data between MDF to DBO, DBO to XLS or in any other format, Backup and Restore of data, FTP Management, Setting up FTP Server (Live), Sending Emails, Designing email panel, How to send an email to various users, Sending auto emails.</p>

Text Books:

1. Professional Visual Studio 2013, Bruce Johnson, Wrox Publication
2. Beginning ASP.NET 4.5.1: in C# and VB, Imar Spaanjaars, Wrox Publication
3. Professional C# 5.0 and .NET 4, C. Nagel, J Glynn, Morgan Skinner, Wrox Publication
4. Pro ASP.NET 3.5 in C# 2008, Matthew MacDonald and Mario S, Wrox Publication
5. Pro ASP.NET MVC 3 Framework, Adam Freeman; Steven Sanderson, Apress
6. Professional ASP.NET MVC 3, Jon Galloway; Phil H; Brad Wilson; K. Scott Allen, Wrox

Reference Books:

1. Pro ASP.NET 4 in C# 2010, Matthew Mac Donald; Adam Freeman; Mario S, Apress
2. Microsoft® ASP.NET 4 Step by Step, George Shepherd, Microsoft Press
3. Programming Microsoft® ASP.NET 4, Dino Esposito, Microsoft Press

**BCA
(SIXTH SEMESTER)**

COURSE CODE: BCA602

COURSE TITLE: DATA MINING AND WAREHOUSING

COURSE OUTCOME:

1. Acquire basic knowledge of Data mining and Data warehousing.
2. Gain Knowledge about Data design and representation.
3. Analyze & learning with Information access and delivery.
4. Understand the importance of Algorithms and clustering.
5. Understand the implementation of web mining and visualization.

**BCA VI
DATA MINING AND WAREHOUSING
PO-CO Mapping**

CO	PO	CO-01	CO-02	CO-03	CO-04	CO-05
	PO-01	✓				
	PO-02					
	PO-03				✓	
	PO-04					
	PO-05					
	PO-06					
	PO-07					
	PO-08					✓
	PO-09					
	PO-10					

BCA (SIXTH SEMESTER)	
PAPER CODE: BCA 602	
PAPER TITLE: DATA MINING AND WAREHOUSING	
MARKS: 75 THEORY: 70 CCA : 30 PRACTICAL: 00	
UNIT-1 15 Hrs.	Overview and Concepts: Need for data warehousing, Basic elements of data warehousing, Trends in data warehousing. Planning And Requirements: Project planning and management, Collecting the requirements. Architecture And Infrastructure: Architectural components, Infrastructure and metadata.
UNIT-2 20 Hrs.	Data Design and Data Representation: Principles of dimensional modeling, Dimensional modeling advanced topics, data extraction, transformation and loading, data quality.
UNIT-3 20 Hrs.	Information Access and Delivery: Matching information to classes of users, OLAP in data warehouse, Data warehousing and the web. Implementation and Maintenance: Physical design process, data warehouse deployment, growth and maintenance.
UNIT-4 20 Hrs	Data Mining Introduction: Basics of data mining, related concepts, Data mining techniques Data Mining Algorithms: Classification, Clustering, Association rules. Knowledge Discovery: KDD Process.
UNIT-5 15 Hrs	Web Mining: Content Mining, Web Structure Mining, Web Usage mining. Advanced Topics: Spatial mining, Temporal mining. Visualization: Data generalization and summarization-based characterization, Analytical characterization: analysis of attribute relevance, Mining class comparisons: Discriminating between different classes, Mining descriptive statistical measures in large databases Data Mining Primitives, Languages, and System Architectures: Data mining primitives, Query language, Designing GUI based on a data mining query language, Architectures of data mining systems Application and Trends in Data Mining: Applications, Systems products and research prototypes, Additional themes in data mining, Trends in data mining.
SUGGESTED READINGS	<p>Text Books:</p> <ol style="list-style-type: none"> 1. Data Mining-Concepts & Techniques, J. Han & M Kamber, Morgan Kaufmann Pub 2. Introduction to Data Mining. P N Tan, M. Steinbach & Vipin Kumar, Pearson education 3. Data Mining Techniques - Arun K Pujari, 2nd edition, Universities Press 4. Data Warehousing in the Real World - Sam Aanhory & Dennis Murray Pearson Edn <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Insight into Data Mining. K P. Soman, S. Diwakar. V. Ajay, PHI, 2008 2. Data Warehousing Fundamentals - Paulraj Ponnaiah Wiley student Edition 3. Data Mining Introductory and Advanced Topics, Margaret H. Dunham, Pearson Education 2004 4. Principles of Data Mining, David Hand, Heikki Manila, Padhraic Smyth, PHI 2004 5. Building the Data Warehouse. W.H. Inmon, Wiley, 2003. 6. Data Warehousing, Data Mining & OLAP, Alex Bezon, Stephen J Smith, McGraw-Hill.

BCA
(SIXTH SEMESTER)

COURSE CODE: BCA603

COURSE TITLE: NETWORK SECURITY

COURSE OUTCOME:

1. Acquire basic knowledge of network security.
2. Gain knowledge about Conventional and Encryption Principles
3. Analyze & learning with public key and cryptography principles.
4. Understand the importance of IP Security.
5. Understand the implementation of various Layers and SET.

BCA VI
NETWORK SECURITY
PO-CO Mapping

CO PO	CO-01	CO-02	CO-03	CO-04	CO-05
PO-01	✓				
PO-02					
PO-03		✓			
PO-04					
PO-05					
PO-06					
PO-07					
PO-08					
PO-09					
PO-10					✓

BCA
(SIXTH SEMESTER)

PAPER CODE: BCA 603

PAPER TITLE: NETWORK SECURITY AND CYBER TECHNOLOGY

MARKS: 75 THEORY: 70 CCA : 30 PRACTICAL: 00

UNIT-1 15 Hrs.	Fundamentals of Network Security : Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms A model for Internetwork security, Internet Standards and RFCs.
UNIT-2 20 Hrs.	Conventional AND Encryption Principles : Conventional encryption algorithms, cipher block modes of operation, location of encryption devices key distribution Approaches of Message Authentication, Hash Functions and HMAC.
UNIT-3 20 Hrs.	Public key cryptography principles : Public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service, Email privacy: Pretty Good Privacy (PGP) and S/MIME.
UNIT-4 20 Hrs	IP Security Overview : IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management, Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).
UNIT-5 15 Hrs	Cyber Laws in India : Information Technology Act, 2000 - a brief overview; Documents or transactions to which IT Act shall not be applicable; meaning of Computer, Computer system and Computer network; E - commerce; E - governance; Concept of Electronic Signature; Concept of Cyber contraventions and Cyber Offences, E-Contract - legal provisions regulating the e - contract with special reference to the provisions of IT Act, 2000.

Text Books:

1. Network Security Essentials (Applications and Standards), William Stallings Pearson Education.
2. Hack Proofing your network, Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand,
3. David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeah, Wiley Dreamtech
4. Internet Law-Text and Materials, Chris Reed, Universal Law Publishing Co., New Delhi
5. Hand book of Cyber Laws, Vakul Sharma, Macmillan India Ltd, New Delhi

Reference Books:

6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.
7. Network Security - Private Communication in a Public World, Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
8. Cryptography and network Security, Third edition, Stallings, PHI/Pearson
9. Principles of Information Security, Whitman, Cengage Learning.
10. IT and Indian Legal System, Kamiesh N. & Murali D.Tiwari(Ed), Macmillan India Ltd, New Delhi
11. The Internet: A User's Guide (2003), K.L.James, Prentice Hall of India, New Delhi
12. Computer Contract & IT Laws (in 2 Volumes), S.V.Joga Rao, 2005 Prolific Law Publications, New Delhi

BCA
(SIXTH SEMESTER)

PAPER CODE: BCA 604

PAPER TITLE: COMPUTER LAB – I (.NET Lab)

MARKS: 50 THEORY: 00 CCA : 00 PRACTICAL: 50

Group A
LIST OF EXPERIMENTS

1. Practical as per Unit-I to Unit-V of theoretical paper BCAT-601
2. Creating an XML Web Services
Overview of XML Web Services XML Web Services Facilitate Communication
XML Web Services Enable Aggregation Creating an simple XML Web Services
Setting Web Method Attribute Setting Web Services Attribute Precompiling an
XML Web Service Testing an XML Web Services from browser Invoking an
XML Web Service with HTTP-Get Invoking an XML Web Service with HTTP-
Post Invoking an XML Web Services with SOAP
3. Advanced XML Web Services
Using the WebService Behavior Examining Limitations of the WebService
Behavior Creating a Simple Page with a WebService Behavior Using
WebService Behavior Callback Functions
4. AJAX(Asynchronous JavaScript and XML)
About Ajax
Server Side Ajax & Client Side Ajax Ajax Toolkit
Setting up and implementing Ajax
5. Microsoft SQL Server Administration
Query analyzer Enterprise Manager Console
Import/Export of data between Remote and Local Server(Live) How to setup
Database server of a website
Converting data between MDF to DBO,DBO to XLS or in any other format.
How to generate SQL Script Backup and Restore of data Using Stored Procedure
Uploading and downloading files from Database server
6. FTP Management Understanding FTP Setting up FTP Server (Live)
Uploading and downloading FTP contents
7. Sending Emails
Designing email panel
How to send an email to various users Sending auto emails

BCA
(SIXTH SEMESTER)

PAPER CODE: BCA 605

PAPER TITLE: MAJOR PROJECT

MARKS: 100

THEORY: 00

CCA : 00

PRACTICAL: 100

MAJOR PROJECT

It is compulsory, that students would have group of maximum of two students and project should be done under Government Sectors/ Public Sector / Pvt. Limited SAA/ Company/ Software Technology Park of India/ ISO 9001 certified company only.

The students should not make any project under local or private institutions.

The students should make project themselves and project will not be copy of other project.

Steps for Live Project

1. Getting customer's requirements
2. Designs, database and business logics
3. Developing software application project
4. Testing and implementing the project
5. Troubleshooting the project application after Implementation

--00--