GOVT. BILASA GIRLS P.G. COLLEGE, BILASPUR (C.G.)

ATAL BIHARI VAJPAYEE VISHWAVIDYALAYA

BILASPUR (C.G.)

DEPARTMENT OF COMPUTER APPLICATION

(Bachelor of Computer Application)
(New Course)

SYLLABUS

(B.C.A.)

2019-2020

Bachelor of Computer Application

(Honors Course)

(Semester I to VI)

Structure & Syllabus for Three Year Degree Program of
Bachelor of Computer Applications (**B.C.A.**)

1. The title of the programme will be Bachelor of Computer Application (B.C.A.) and will be introduced from the academic year 2017-2018.

2. Objectives: The objectives of the Programme shall be to provide sound academic base from which an advanced career in Computer Application can be developed. Conceptual grounding in computer usage as well as its practical software application will be provided.

3. Eligibility for admission : In order to be eligible for admission to Bachelor of Computer Applications a candidate must have passed HSC (10+2) from Mathematics and English as passing Subject with minimum 40% marks in aggregate.

4. Duration: The duration of the B.C.A. Degree Program shall be three years divided into six semesters.

5. The scheme of Examinations: The BCA Examination will be of 2800 marks as given Below:

    I) Compulsory papers and Basic Papers: 600 marks

    II) For Theory Papers and Practical Papers: 2200 marks

6. The Standard of Passing and Award of Class in order to pass in the examination the candidate has to obtain 34% marks out of 100. (Min 34% marks must be obtained in theoretical papers as well as practical papers of University Examination). The class will be awarded on the basis of aggregate marks obtained by the candidate for all three years examinations.

7. RULES OF A.T.K.T. As per section 14   promotion rule.

8. The Medium of Instruction and Examination (Written and Viva) shall be English/Hindi.

    Instructions to Paper Setters:

9. In each theory paper, maximum 100 marks. (each theory and course paper will be of 80 marks in external / end semester examination plus 20 marks in internal). Question paper should be in English as well as Hindi. Minimum passing marks in external 28 out of 80 and internal 7 out of 20. For practical examination minimum passing marks shall be 34% in each practical / project.

10. The Semester wise Structure & plan of the program shall be as follows:

Govt. Bilasa Girls' PG College Bilaspur (C.G.)
Course structure - Bachelor of Computer Application

	Semester	Title of Theory Paper	Theory		Internal		Practical		Project		Total	
			Max M.	Min M.	Max M.	Min M.	Max M.	Min M.	Max M.	Min M.	Max M.	Min M.
1	I	Computer Fundamental	80	28	20	8					100	34
2		Discrete Mathematics	80	28	20	8					100	34
3		PC Software Package	80	28	20	8					100	34
4		Environmental Science	60	21	15	8			25	9	100	34
		Total Marks									400	136
1	II	Programming Methodology and C programming	80	28	20	8					100	34
2		Operating System	80	28	20	8					100	34
3		Concept of software	80	28	20	8					100	34
4		English	80	28	20	8					100	17
5		LAB I - Lab of Software packages					50	17			50	17
6		LAB II - Programming Lab in C					50	17			50	17
		Total Marks									500	170
1	III	Digital Electronics and Micro Processor	80	28	20	8					100	34
2		Computer Networks	80	28	20	8					100	34
3		Data Structure	80	28	20	8					100	34
4		English	80	28	20	8					100	34
		Total Marks									400	136
1	IV	Object Oriented Programming using C++	80	28	20	8					100	34
2		Computer Graphics and Multimedia	80	28	20	8					100	34
3		Computer organization and Architecture	80	28	20	8					100	34
4		LAB III - Programming lab using C++					50	17			50	17
5		LAB IV - Multimedia					50	17			50	17
6		Hindi	80	28	20	8					100	34
		Total marks									500	170
1	V	Numerical Analysis	80	28	20	8					100	34
2		Software Engineering and Project Management	80	28	20	8					100	34
3		Database Design and RDBMS	80	28	20	8					100	34
4		Introduction to AI and Expert System	80	28	20	8					100	34
5		Hindi	80	28	20	8					100	34
		Total Marks									500	170
1	VI	NET Technology	80	28	20	8					100	34
2		Data Mining and Data Warehousing	80	28	20	8					100	34
3		Current Trends and Technology in Computer Science	80	28	20	8					100	34

		Network Security and Cyber Technology	80	28	20	8						100	34
		Net. Lab.							100	34		100	34
4		Major Project							100	34		100	34
5		Skill based	80	28	20	8						100	34
		Total marks										700	238

B.C.A. - Semester I
Computer Application
[*Paper: I – Computer Fundamental*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I : 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, DDRRAM, etc

Unit-II: 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.

Unit – III: 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.

Unit-IV: 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, Frontpad, System Information utility, System file checker, Windows Tuneup Wizard.

Unit – V: Software Packages:
Electronic Spreadsheet, Word processing software, other pre-written software packages, Data communication packages, Desktop publishing.

Text Books
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:

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.

B.C.A. - Semester I
Computer Application
[*Paper: II - Discrete Mathematics*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I
Recall of statements and logical connectives, tautologies and contradictions, logical equivalence, algebra of propositions quantifiers, existential quantifiers and universal quantifiers.

Unit -II
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-III
Boolean functions - disjunctive and conjugative normal forms. Boolean's expansion theorem, fundamental forms. Many terminal Networks.

Unit -IV
Arbitrary Cartesian product of sets. Equivalence relations, partition of sets, injective, surjective, bijective maps, binary operations, countable, uncountable sets.

Unit-V
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.

Text Books:
2. Boolean Algebra and Its Applications, J. Eldon Whitesitt, Addison-Wesley.
3. A Textbook of Discrete Mathematics, Swapan Kumar Sarkar, S. Chand.
4. Discrete Math with Proof, Eric Gossett, Pearson.
5. Discrete Math Workbook: Interactive Exercises, James R Bush, Pearson.

Reference Books:
1. Discrete Mathematics, Prof. H K Pathak, Shiksha Sahitya Prakashan
2. Discrete Maths, C.L.Liu, T McGraw Hill

B.C.A. – Semester I
Computer Application
[*Paper: III – PC Software Package*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I : 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.

Unit- II : 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.

Unit-III : 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.

Unit-IV : 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.

Unit-V : 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.

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.

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B.C.A. - Semester II
Computer Application
[*Paper: I – Programming Methodology and C Programming*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit – I : 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 Associatively- Mathematical Functions, Library functions: Getchar (), putchar (), printf (), scanf (), puts (), gets ().

Unit-II : 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.

Unit - III : 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.

Unit-IV : 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.

Unit-V : 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.

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. PROGRAMMINGWITH C. Byron Govtfred, Tata McGraw HILL

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

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B.C.A. – Semester II
Computer Application
[*Paper: II – Operating System*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit - I: 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.

Unit – II: 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.

Unit-III: 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.

Unit-IV: 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.

Unit-V: File-System Implementation
A Simple File System, Logical & Physical File System, File-System Interface: Access Methods, Directory Structure, Protection, Free-Space Management, Directory Implementation.

Text Books:
1. Operating System Concepts, Silbersachatz 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

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B.C.A. - Semester II
Computer Application
[*Paper: III – Concept of Software*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I : Category of Software with example and brief features

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.

Unit- II : System Software

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.

Unit-III : Assemblers and Macro processors

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, Recursive Macro. Symbolic debugger.

Unit – IV : Loaders and Linkage Editors

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.

Unit-V Compilers

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.

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

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B.C.A. – Semester II
Computer Application
[*LAB: I – Lab of Software Packages*]

Max. Marks: 50x2   **Min. Marks: 17x2**

Section-A
WINDOWS 7 : Basic Elements of WINDOWS, My Computer, Sharing Devices, Windows Explorer, Accessories: 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.

Section-B
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.

Section-C
Introduction to MS Power Point: Opening new Presentation, Different presentation templates, Setting backgrounds, Selecting presentation layouts, Creating a presentation, Formatting a presentation-Adding style, Color, gradient fills, Arranging objects, Adding Header & Footer, Slide Background, Slide layout, Inserting pictures, movies, tables.

Section-D
Introduction to MS Excel: Introduction: Spreadsheet & its Applications, Opening spreadsheet, Menus & Toolbars & icons, Shortcuts, Working with Spreadsheets-Opening a File, Saving Files, Setting Margins, Converting files to different formats- Importing, Exporting ar^Sending files to others, Spreadsheet addressing, Entering and Editing Data, Computing data- Setting Formula, Finding total in a column or row, Mathematical operations, Formulas, Formatting Spreadsheets & Printing worksheet.

Section-E:
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.

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BCA IInd SemSofware PC package Practical Questions

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	242000
Tata	Sumo	390000
	Sierra	447000

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. 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

10. Make powerpoint presentation using 4 slides, insert picture, tables on your own topic.
11. Make powerpoint presentation using 4 slides, set header footer, use custom animations and slide transition.
12. Create Employee database in MS-Access

Employee

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

13. Create Student Form in MS-Access using the following labels –
    RollNo
    Name
    FName
    DOB
    Address
    Result

14. Do the following in MS-Word
    - Create Table
    - Insert Picture
    - Type one para and apply font style, size and color

15. Do the following in MS-Excel
    - find the total using function
    - Find the average
    - Find max and min value

- insert the column

B.C.A. – Semester II
Computer Application
[*LAB: II* – **Programing Lab in C**

List of C Programs

Program to Find area and circumference of circle.

Program to Find the Simple interest.

Program to Find Convert Temperature form degree centigrade to   Fahrenheit.

Program to Find Calculate sum of 5 subjects & find percentage.

Program to Show swap of two no's without using third variable.

Program to reverse a given number.

Program to print a table of any numbers.

Program to find greatest in 3 numbers.

Program to show the use of conditional operator.

Program to find that entered year is leap year. Or not.

Program to find whether given no is even or odd.

Program to shift input data by two bits to the left.

Program to use switch statement, Display Monday to Sunday.

Program to display arithmetic operator using switch case.

Program to display first 10 natural no & their sum.

Program to print Fibonacci series up to 100.

Program to find GCD &HCF of given Numbers using Recursion.

Program to find whether gives no is a prime no or net.

Program to display sum of Series 1+1/2+1/3…….+7/n.

Program to display series and find sum of 1+3+5+…. +n.

Program to use bitwise AND operator between the two integers.

Program to add two number using pointer.

Program to find sum, subtraction, multiplication & Transpose of matrices .

Program to reverse a number using the pointer .

Program to show input and output of a string.

Program to find square of a number using functions .

Program to swap two number using of function .

Program to find factorial of a number using functions.

Program to show table of a number using functions.

Program to show call by value.

Program to show call by reference.

Program to find largest of two number using function.

B.C.A. – Semester III
Computer Application
[*Paper: I – Digital Electronics and Microprocessor*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit – I: 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 – II: 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 – III: 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 – IV: 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 – V: 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 book:
1. Modern Digital Electronics, R. P. Jain, TMH
2. Digital Principles & Application, Leach & Malvino, TMH
3. Digital Logic Design, Morries Mano, PHI
5. Microprocessor – Architecture, Programming and Applications with the 8085, Ramesh S. Gaonkar

Reference Books:
1. Digital Integreated Electronics, H. taub & D. Shilling, McGraw Hill
2. Digital Principles & Design, Givone, TMH
3. Digital Circiut & Design, S. Aligahanan, S. Aribazhangan, Bikas Publishing House.
4. Fundamental of Digital Electronics & Micropressor, Anokh Singh, A. K. Chhabra, S. Chand

B.C.A. – Semester III
Computer Application
[*Paper: II – Computer Networks*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit – I: 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 – II: 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 – III: 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 – IV: 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 – V: 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.

Text books:
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 book:
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.

B.C.A. – Semester III
Computer Application
[*Paper: III –Data Structure*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I : 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-II : 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-III : 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-IV : 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-V : 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.

Text Book:
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.
6. Data Structures and Program Design in C, Robert Kruse, PHI of Data Structures, Jr. Symour Lipschetz, Schaum's outline by TMH.

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B.C.A. – Semester IV
Computer Application
[*Paper: I –Object Oriented Programming Using C++*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I
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- II
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-III
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-IV
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-V
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.

Text books:
1. C++, The Complete Reference, 4th Edition, Herbert Schildt, TMH.
2. Object Oriented Programming in C++, 4th Edition, R.Lafore, SAMS, Pearson Education

Reference Books:
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.
4.   The Art, Philosophy and Science of OOP with C++, R.Miller,SPD. OP in C++,J3rd Edition, T.Gaddis, J.Walters and G.Muganda, Wiley DreamTech Press.
5.   An Introduction to OOP in C++ with applications in Computer Graphics, 2nd Edition, G.M.Seed, Springer.
6.   Programming with ANSI C++, B.Trivedi,Oxford Press.

B.C.A. – Semester IV
Computer Application
[Paper : II – Computer Graphics and Multimedia]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I: 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-II: 2D Transformations
2-D 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-III: 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-IV: 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-V: 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.

Text Books:
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

Reference Books:
1.   Mathematical Elements for Computer Graphics,, Rogers and Adam, Tata McGraw Hill.
2.   Theory & Problem of Computer Graphics, Plastock, Schaum Series.
3.   Computer Graphics, Tosijasu, L.K., Springer-verleg
4.   Principles of Interactive Computer Graphics, Newman, Tata McGraw Hill.

B.C.A. – Semester IV
Computer Application
[*Paper: III – Computer Organization and Architecture*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I : Pipeline:
Linear: pipeline processor, Non linear pipeline processor, Instruction pipeline design, Mechanisms, Dynamic instruction scheduling, Arithmetic pipeline design, Super-scalar processors, VLIW architecture.

Unit-II: 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.

Unit-III : 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.

Unit-IV : Synchronous Parallel Processing:
Vector instruction types, vector access memory schemes, vector and symbolic processors,SIMD architecture, SIMD parallel algorithms, SIMD computers and performance enhancements.

Unit-V : System Interconnection:
Network properties and routing, static interconnection networks, dynamic interconnection networks, Multiprocessor system interconnection, Multistage & combining networks.

Text Books
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.

Reference Books:
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.

B.C.A. – Semester IV
Computer Application
[*LAB: III – Programming Lab Using C++*]

Max. Marks: 50   **Min. Marks:17**

List of Sample Problems/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
   a)   To find the factorial of a given integer,
   b)   To find the GCD of two given integers,
   c)   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:
   a)   Reading a matrix,
   b)   Printing a matrix,
   c)   Addition of matrices
   d)   Subtraction of matrices.
   e)   Multiplication of matrices.

9.   Write a program to demonstrate concept of method overloading.
10.   Write a program to demonstrate concept of method overriding.
11.   Write a program to demonstrate concept of inheritance.
12 .   Write a program to demonstrate concept of operator overloading.
13.   Write a program to demonstrate concept of virtual and pure virtual function.
14.   Write a program to demonstrate concept of polymorphism.
15.   Write a program to demonstrate concept of friend function and friend class.

B.C.A. – Semester IV
Computer Application
*[**LAB: IV** – Multimedia Lab]*

Max. Marks: 50   **Min. Marks: 17**

Series of Practical Curriculums

Photoshop:

1. (i) Handling different file formats and interchanging them, changing the resolution, color, grayscales and size of the images

   (ii) Using, brushes and creating multicolor real life images. Cropping, rotating, overlapping, superimposing, pasting photos on a page, Creation of a single image from selected portions of many, Developing a commercial brochure with background tints, Creating an image with multi-layers of images and texts. Applying masks and filtering on images.

CorelDRAW X4 Part 1

- Getting Started with CorelDRAW
- Starting CorelDRAW
- Working with Command Bars
- Working with Layers
- Examining a Master Page
- Creating a Master Layer
- Working with Layers
- Using Brush Tools and Adding Objects
- Working with Interactive Tools
- Using Advanced Techniques for Text Manipulation
- Working with Paragraph Text
- The PowerClip Feature and the Envelope Tool
- Creating Bulleted Lists
- Working with Vector and Bitmap Graphics
- Converting Vector Objects to Bitmaps
- Working with Bitmap Graphics
- Introduction to CorelTRACE
- Advanced Output Options
- Preparing a Document For Printing
- Other Printing Options

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B.C.A. - Semester V
Computer Application
[Paper: I – Numerical Analysis]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I : 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-II : 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 –III : Interpolation - Single Variable Functions
Newton's Interpolation formula, Newton's Forward and Backward Difference Interpolation Formula, Langranges Interpolation formula, Newton's Divided Difference Interpolation Formula.

Unit –IV : Numerical Differentiation and Integration
Newton - cotes integration formula, Trapezoidal Rule, Simpson's One-Third and Three- Eight Rule, Waddle's Rule.

Unit-V : 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.

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.

2019-20
B.C.A. - Semester V
Computer Application
[*Paper: II – Software Engineering and Project Management*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I : 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 II : 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-III : 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 –IV : 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-V : 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.

B.C.A. - Semester V
Computer Application
[*Paper: III – Database Design and RDBMS*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I : 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.

Unit-II : 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.

Unit –III : 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.

Unit-IV : 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.

Unit –V : 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.

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.

B.C.A. - Semester V
Computer Application
[*Paper: IV – Introduction to AI and Expert System*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I : Overview of Artificial Intelligence
Definition & Importance of Al, 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.

Unit-II : 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.

Unit-III : Knowledge Representation, Reasoning and Structured Knowledge
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.

Unit –IV : 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

Unit-V : Expert Systems Architectures
Introduction, Rule Based System Architecture. Non-Production System Architecture, Dealing with uncertainty. Knowledge Acquisition and Validation, Knowledge System Building Tools

Text Book:
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.   Al-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.

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Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I : 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 Conrols, Advanced Database Programming using ADO.net, Using GDI +, Networking, net Remoting, Manipulating XML.

Unit-II : 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

Unit-III : 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 Stcite, 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.

Unit-IV : 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, Formating 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.

Unit-V : Advanced Applications with .NET Technology
XML Web Services: Setting WebMethod Attribute, Setting WebServices 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.

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

B.C.A. - Semester VI
Computer Application
[*Paper: II – Data Mining and Warehousing*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I : 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-II : Data Design and Data Representation:
Principles of dimensional modeling, Dimensional modeling advanced topics, data extraction, transformation and loading, data quality.

Unit-III : 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-IV : Data Mining Introduction:
Basics of data mining, related concepts, Data mining techniques Data Mining Algorithms: Classification, Clustering, Association rules. Knowledge Discovery: KDD Process.

Unit –V : 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

Text Books:
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

Reference Books:
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 Symth, PHI 2004
5   Building the Data Warehouse. W.H.Inmon, Wiley, 2003.
6   Data Warehousing, Data Mining & OLAP, Alex Bezon, Stephen J Smith, MeGraw-Hill.

B.C.A. – Semester VI
Computer Application
[*Paper: III – Current Trends and Technology in Computer Science*]

Max. Marks: 80   **Min. Marks: 28**   **Hours 45; Credit-3**

Unit-I : Fundamentals of advanced computing
System models for advanced computing -clusters of cooperative computing, grid computing and cloud computing; software systems for advanced computing-service oriented software and parallel and distributed programming models with introductory details, Features of grid and clpttoplatform.

Unit-II : Grid Computing
Grid Architecture and Service modeling, Grid resource management, Grid Application trends, Characterization of Grids, Organizations and their Roles, Grid Computing Road Maps, Review of Web Services-OGSA-WSRF.

Unit-III : Grid Monitoring
Grid Monitoring: Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems- GridlCE - JAMM -MDS-Network Weather Service-R-GMA-Other Monitoring Systems- Ganglia and GridM.

Unit-IV : Cluster Computing
Introduction: Overview of Cluster Computing, The Role of Clusters, Definition and Taxonomy Of Parallel Computing, Hardware System Structure, Node Software, Resource Management, Distributed Programming, Limitations, Cluster Planning, Architecture , Node Hardware and Node Software, Design Decisions.

Unit-V : Cloud Computing
Cloud Computing services models and features in Saas, Paas and laas; Service oriented architecture and web services; Features of cloud computing architectures and simple case studies, Virtualization- Characteristic features, Taxonomy Hypervisor, Virtualization and Cloud Computing, Pros and Cons of Cloud Computing, Technology Examples/Case Studies.

Text Books:
1.   Distributed and Cloud Computing, Kaittwang Geoffrey C.Fox and Jack J Dongrra, Elsevier India 2012.
2.   Mastering Cloud Computing- Raj Kumar Buyya, Christian Vecchiola and S Tanurai Selvi, TMH, 2012.
3.   Beowulf Cluster Computing with Linux, William Gropp, Ewing Lusk, Thomas Sterling, MIT Press, 2003
4.   Grid Computing, Joshy Joseph and Craig Fellenstein, Pearson Education 2004. 5. The Grid Core Technologies, Maozhen Li, Mark Baker, John Wiley and Sons , 2005.

Reference Books:
1.   Cloud Computing, John W. Ritting House and James F Ramsome, CRC Press, 2012Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2012.
2.   In Search of Clusters: The ongoing battle in Lowly Parallel Computing, Gregory F P Fister, Second Edition, Prentice Hall Publishing Company, 1998.
3.   The Grid 2 - Blueprint for a New Computing Infrastructure, Ian Foster and Carl Kesselman, Morgan Kaufman - 2004.
4.   Grid Computing: Making the Global Infrastructure a reality, Fran Berman, Geoffrey Fox, Anthony J.G. Hey, John Wiley and sons

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Computer Application

[Paper IV - *NETWORK SECURITY AND CYBER TECHNOLOGY*]

Unit-I
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-II
Conventional AND Encryption Principles

Conventional encryption algorithms, cipher block modes of operation, location of encryption dev ces key distribution Approaches of Message Authentication, Hash Functions and HMAC.

Unit -III
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-IV
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-V
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, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeh, Wiley Dreamtech
3. Internet Law-Text and Materials, Chris Reed, Universal Law Publishing Co., New Delhi
4. Hand book of Cyber Laws, Vakul Sharma, Macmillan India Ltd, New Delhi

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

2019-20
B.C.A. - Semester VI
LAB I – NET LAB

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 WebMethod Attribute Setting WebServices 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

B.C.A. - Semester VI
Computer Application
[Project: Major Project]

Max. Marks: 100   **Min. Marks: 34**

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.

<u>Steps for Live Project</u>

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

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