RAJEEV GANDHI GOVT. PG COLLEGE AMBIKAPUR CHHATTISGARH

DEPARTMENT OF COMPUTER SCIENCE

BACHELOR OF SCIENCE
IN
COMPUTER SCIENCE

SYLLABUS

CBCS STRUCTURE FOR B.Sc. (CS)

2023 - 2024

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

Department of Computer Science

Members of Board of Studies

S.No	Name	Role	Signature
1.	Miss Monika Xess, Assistant Professor & Head, Department of Computer Science, Rajeev Gandhi Govt. PG College, Ambikapur (C.G.)	Chairman	
2.	Dr. Srishti Tripathi, Assistant Professor Kirodimal Govt. Arts & Science College, Raigarh (C.G.)	Member	
3.	Dr. Ganesh Ram Nayak, Assistant Professor Govt. Dr. Waman Wasudev Patankar Girl's PG College Durg (C.G.)	Member	
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6.	Mr. Raunak Pandey, Rajeev Gandhi Govt. PG College, Ambikapur (C.G.)	Student Member	

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

Department of Computer Science

VISION

The vision of the Computer Science Department is to generate competent professionals with the ability to solve problems, individually and in teams at local and national levels. Excel in the emerging areas of computer science by imparting knowledge, scholarly activity, creative endeavors and public service.

MISSION

- ➢ To provide strong fundamental and technical skills for computer science through effective teaching learning methodologies.
- ➢ To uplift innovative research in Computer Science for sustainable development of the Country's IT industry, Society and Government needs.
- ➢ To transform lives of the students by nurturing ethical values, creativity and commitment to lifelong learning.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)	
PEO1	Students will create and collaborate in emergent computing technologies leading to innovative solutions for industry and academia.
PEO2	Develop strong skills in systematic planning, developing algorithms and providing solutions for computer based systems which helps in employability.
PEO3	To impart the need for consistent learning, importance of research & development for the welfare of the society and to the nation at large.
PEO4	Students will focus on team spirit, leadership, communication, ethics and social values, which will lead to apply knowledge of societal impacts of computing technologies.

PROGRAM OUTCOMES (POs)	
On successful completion of the B.Sc. Computer Science program:	
PO1	**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.
PO2	**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.
PO3	**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
PO4	**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.
PO5	**Application Systems Knowledge:** Possessing a sound knowledge on computer application software and ability to design and develop app for applicative problems.
PO6	**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.
PO7	**Industry Familiar:** Student will be able to become industry familiar.
PO8	**Project Management:** Practicing of existing projects and becoming independent to launch own project by identifying a gap in solutions.
PO9	**Ethics on Profession, Environment and Society:** Exhibiting professional ethics to maintain the integrality in a working environment and also have concern on societal impacts due to computer-based solutions for problems.
PO10	**Motivation to take up Higher Studies:** Inspiration to continue educations towards advanced studies on Computer Science.

GRADUATE ATTRIBUTES (GA) IN COMPUTER SCIENCE	
GA1	Ability to identify a problem, analyzes using design thinking techniques, and evolves innovative approaches for solving it.
GA2	Ability to apply mathematical concepts and techniques in problem solving.
GA3	Ability to function effectively in multicultural teams to accomplish a common goal.
GA4	Ability to self-learn and engage in life-long learning and upgrade technical skills.
GA5	An understanding of professional and ethical responsibility.
GA6	Ability to undertake small research tasks and projects.
GA7	Exposure to emerging technologies such as DSA, Programming language, Cloud Technology etc.
GA8	Understanding of computing systems at computer architecture, operating systems, and distributed computing levels, and how they affect the performance of software applications.
GA9	Ability to design and apply appropriate algorithms and data structures for evolving efficient computing based solutions for new problems.
GA10	Understanding of theoretical foundations, fundamental principles, and limits of computing

PROGRAM SPECIFIC OUTCOMES (PSOs)	
After successful completion of B.Sc. Computer Science program, the students will be able to:	
PSO1	Apply fundamental knowledge of theoretical computer science and critically analyze problems to provide computer based solutions for various applications.
PSO2	Design cost effective hardware/software systems using the knowledge of hardware and/or software architecture, programming and development.
PSO3	To Demonstrate skills to use modern tools, software and equipment for problem solving in new and emerging disciplines.
PSO4	Apply domain knowledge and expertise for enhancing research capability to transform innovative ideas into reality.

PROGRAM LEARNING OUTCOMES (PLOs) for B.Sc. in COMPUTER SCIENCE	
PLO-1	**Problem Analysis and solutions:** Think critically, identify, analyze problems/situations and further attempt to design/develop solutions that meet the specified goals.
PLO-2	**Use of Technology:** Apply appropriate IT tools efficiently in their daily life-professional and personal.
PLO-3	**Environment and Sustainability:** Be aware of environmental issues and commit towards sustainable development at local/national and global context.
PLO-4	**Ethics:** Recognize and understand professional ethics/human values and be responsible.
PLO-5	**Individual and Team work:** Function effectively at various levels, capacities and situations.
PLO-6	**Communication:** Communicate proficiently (oral and written) as a responsible member of society.
PLO-7	**Research Aptitude:** Understand general research methods and be able to analyze, interpret and derive rational conclusions.
PLO-8	**Life Skills:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change.

PROGRAM STRUCTURE AND SCHEME:

The B.Sc. program is a Three-year course divided into six semesters. A student has to complete the required credits for the completion of course and the award of degree. Each semester contains one Computer Science Paper.

		Semester	*Semester*
Part – I	First Year	Semester I	Semester II
Part – II	Second Year	Semester III	Semester IV
Part-III	Third Year	Semester V	Semester VI

SCHEME OF B.Sc. COMPUTER SCIENCE PROGRAM

Course Code	Course Title	Theory Marks		Internal Marks		Practical Marks		Project Marks		Total	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
BSC 101	COMPUTER FUNDAMENTAL & PC PACKAGE	70	25	30	11	-	-	-	-	100	36
BSC 102	PROGRAMMING METHODOLOGY WITH C	50	18	25	9	25	9	-	-	100	36
BSC 203	COMPUTER ARCHITECTURE	70	25	30	11	-	-	-	-	100	36
BSC 204	INTRODUCTION TO DATA STRUCTURE AND OOPS	50	18	25	9	25	9	-	-	100	36
BSC 305	SYSTEM ANALYSIS AND DESIGN	70	25	30	11	-	-	-	-	100	36
BSC 306	DATABASE MANAGEMENT SYSTEM AND WEB TECHNOLOGY	50	18	25	9	25	9	-	-	100	36
	TOTAL									700	

Department of Computer Science, Rajeev Gandhi Govt. PG College Ambikapur

B.Sc. SEMESTER-I

BSC 101: COMPUTER FUNDAMENTAL & PC PACKAGES

COURSE OUTCOMES:

Students, after completion of this course will be able to:

CO1: Understand the history and various generations of computer, characteristics of computer and its types.

CO2: Gain Knowledge about H/w and S/w Concepts with its technology areas.

CO3: Gain Knowledge while working with MS-Word along with its tools.

CO4: Analyze & learning with MS-Excel and its applications.

CO5: Understand the importance of MS-PowerPoint with setting templates and views.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓			✓			✓			✓
CO2		✓			✓		✓		✓	
CO3	✓		✓					✓		✓
CO4	✓	✓			✓	✓	✓			✓
CO5	✓	✓		✓		✓			✓	✓

BSC 101: Computer Fundamental & PC Packages

Unit-I Basic of Computer

What is Computer? Introduction to Computing, History of Computer, Application and issues of Computer ,Components of Computer; Input device, Output Devices, System Unit, Storage Devices, Connectivity, Video ports, USB port, all other Ports.

Unit- II Processing Unit

Processor Building Blocks; Control Unit, Arithmetic Logic unit, Register unit, comparison of personal computer processors, processor for mini, mainframe, Large and Super computers, Examples of Various processor and their families, Category of processor on basis of word length, working of processor and Execution process machine cycle system Clock.

Unit–III Memory and I/O/Devices

Types of memory: RAM, cache, ROM, flash memory, CMOS, Cloud Storage, Optical Discs; CDs, DVDs, memory Hierarchy Input Devices keyboard, Mouse, Trackball, Touchpad, pointing, Stick, and other memory output Devices; LCD & Plasma Monitors, other Monitors Prints: Nonimpact, Ink-Jet, Photo, Laser printer, plotters, Speakers, Headphones and Ear-buds, Data projectors, Interactive whiteboards.

Unit-IV MS WINDOWS 7AND MS-WORD

Installing WINDOWS, Basic Element of WINDOWS, Working with windows, connecting to the Internet: Dial –up Connections, Broadband Connections, Installing New hard ware & printer, Installing & Removing Software, Power Setting, MS Word: Menus, shortcuts, Document types, working with Document types, Working with Document: Function of tool bar and menu bar. MS power point: Creating new Presentation templates, setting background, Function of Tool Bar and Menu bar, Inserting pictures, Movies, tables, etc into the presentation, Setting Animation & Transition effect, Adding audio and video, Printing Handouts, Generating standalone presentation viewer.

Unit– V MS-Excel and MS-Access

Introduction :- Spreadsheet & its Applications, & Toolbars & icons, Shortcuts, Working with spreadsheet, Computing data Formula, Formatting Spreadsheet, Worksheet: Sheet Formatting& style background, Graphs, printing, worksheet, MS Access: Database concepts: Tables, Queries, Forms, Reports, Opening & Saving database file: Creating Tables, Table Design,Indexing,EnteringData,Importingdata,CreatingQueries:SQLstatement,settingRelationship,Forms:GUl,Form,Creating& Printing reports.

Text Books:-

1. Computer Science: an overview, Brookshear J.G.pearson Education.
2. Fundamental of Computer Raja RamanV, Prentic Hall of IndiaNewDelhi.
3. ComdexComputerCourseKit(Windows7withoffice2010),GuptaVikas,DreamtechPublication.
4. MasteringMSOffice2000professionalEditionbyCourter, BPBpublication.
5. MSOffice2000TrainingGuidebyMaria, BPBPublication.
6. MSOffice Complete by SYBEX.

Reference Books:-

1. PC Upgrade & Repair Black Book by RonGilster.
2. Fundamentals of Computers & Information Technology, A.Jaiswal, Dreamtech press.

B.Sc. SEMESTER-II

BSC 102: PROGRAMMING METHODOLOGY WITH C

COURSE OUTCOMES:

Students, after completion of this course will be able to:

CO1: Understand the basic terminology used in computer programming.

CO2: Understand different data types, operators and its types, operator precedence and associativity in C language.

CO3: Design programs involving decision structures, loops and functions.

CO4: Explain the difference between call by value and call by reference.

CO5: Understand the dynamics memory by the use of pointers.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓				✓				✓	
CO2	✓				✓				✓	✓
CO3	✓	✓	✓	✓	✓		✓	✓		
CO4	✓	✓	✓	✓		✓				✓
CO5	✓	✓				✓	✓			✓

BSC 102: Programming Methodology with C

UNIT-I: Introduction to Program Concept.

Characteristics of Programming Various stages in Program Development, Design of Algorithms, Definition. Features of Algorithms, Criteria to be Followed by an Algorithm, Analysis of Algorithm, Efficiency of Algorithm, Algorithm Complexity, Flow charts – Symbols, Rules for making Flow chart Pseudo codes and decision tables, Programming Techniques–Top down, Bottom up, structured programming and modular programming, merits, Demerits, and their Comparative study, Problem-solving Techniques, Step forproblem–solving,usingcomputerasaproblem-solvingTool,Problemanalysis.

UNIT–II Introduction to C PROGRAMME

Structure of C program, character set, C Tokens, keyword, identifiers, constants, variables, data types, Types of operators and expressions, Precedence of arithmetic operator Type conversion in expressions, Operators Precedence input and output Function in C Control Structure–if, If-Else, Nesting of If-Else, Else-If ladder statement, switch statement, Conditional operator, GOTO, Statement Loop Introduction, while Do white, For Loop, jumps in Loop.

Unit-III Arrays, String & Function

DefinitionInitialization,characteristicOneTwoandMultidimensionalArrays,string –Introduction, working with String & standard Function –Introduction, Need for user defined Function, From of C Function, Return value and their types, Declaration, Prototypes, Category of function, function with arrays, call by value and reference, The Scope and lifetime of variables in Function.

Unit-IV Structure, Union &Pointers

Declaration:-Initialization, Arrays of structure, Structure within Structure, Structure and Function Union Size of Structure , Bit Fields pointer –Introduction, Declaring and initializing Pointer Accessing a variable pointer expression. Pointer and arrays, pointer and character string Pointer and Function, pointer and structure, pointer to pointer.

Unit–V File management

Introduction, Defining and operating a file Closing a file, Streams and file types, file operator file I/O read, with and other standard function of file, random access to file, Dynamic memory Allocation, The preprocessor.

Text Book:-

1. LET US C, Yeshwant Kanetkar, BPB PUBLICATIONS.

2. The Complete Reference C Herbert Schilddt, Tata McGraw HILL.

3. PROGRAMMING IN ANSLC-by E. Balgurusamy-Tata Mc GrawHILL. PROGRAMMINMG.

Reference Book:-

1. The "C" Programming Language, Briain W. Kenigham &Dennis Ritchie,Pearson.

2. Mastering "c"–Crain Bolon.

3. The Spirit of "c" Henrry Mulish, Herbert.L. Cooper.

4. Gottfried, Schaums Outline Series, "Programming with C"TMH Publications.

LAB WORK:
List of C Programs:

1. Write a C program to find largest number among three numbers.
2. Write a C program to check whether the given number is even or odd.
3. Write a C program to calculate area and circumference of a circle.
4. Write a C program for arithmetic operations using switch statement.
5. Write a C program to display Fibonacci series using for loop.
6. Write a C program to find sum of first n natural numbers using while loop.
7. Write a C program to swap two numbers with and without using temporary variable.
8. Write a C program to find the size of data types in C.
9. Write a C program to find ASCII value of a character.
10. Write C programs to print pyramids and patterns.
11. Write C program's to demonstrate Array.
12. Write C program's to demonstrate Pointer.
13. Write C program's to demonstrate String.
14. Write C program's to demonstrate functions.
15. Write C program's to demonstrate Structure and Union.
16. Write C program's to demonstrate File Handling concepts

PC-Package LAB:

The Lab Exercise should be based on mswindows7 of sharing version and ms office 2007 of higher version and comprises the theoretical paper as well as practical paper.

1. WINDOWS 7 :- Basic Elements of WINDOWS, My Computer, Sharing Devices, windows Explorer, Accessories: Entertainment, Communication, System Tools paint, Brush, Calculator, Calendar, Clock, Notepad, word pad, Etc., Control panel, Changing Color and Theme, Changing the Desktop Background, Screen Saver, Adjusting Display Settings, Adjusting Sound, Changing the Date and Time.
2. Practical's based on MS word features and functions.
3. Practical's based on MS Power Point features and functions.
4. Practical's based on MS Excel formulas and functions.
5. Practical's based on MS Access concepts.

B.Sc. SEMESTER-III

BSC 203: COMPUTER ARCHITECTURE

COURSE OUTCOMES:

Students, after completion of this course will be able to:

CO1: Describe the fundamental organization of a computer system and number systems.

CO2: Explain the Boolean algebra with simplification methods and various types of logic circuits.

CO3: Explain fundamental functions of CPU Organization.

CO4: Describe basic concept of Input-output organization.

CO5: Distinguish the organization of various parts of a system memory hierarchy and memory managementsystem.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓									
CO2	✓			✓		✓				✓
CO3	✓		✓		✓		✓		✓	✓
CO4	✓	✓			✓		✓			✓
CO5	✓	✓	✓	✓		✓	✓	✓	✓	✓

BSC 203: Computer Architecture

UNIT-I: Data Representation:

Number Systems - Decimal, Binary, Hexadecimal, Octal. BCD, Conversion from one number system to another number system, binary arithmetic, complements (n-1's and n's), Signed and Unsigned numbers, Addition and Subtraction, Multiplication, representation of negative numbers. Fixed point representation & floating point representation.

UNIT-II: Logic gates, Boolean algebra& Switching functions:
Fundamental postulates of Boolean algebra, Basic theorems and properties, Canonical and Standard forms, Truth Tables, OR, AND, NOT, XOR, Universal (NOR and NAND Gates, Multilevel NAND/NOR realizations, properties of logic gates, Algebraic simplification digital logic gates. De Morgan's theorem. Standard representation of logic function (SOP and POS), Minimization technique- K Map method, Prime implicates, don't care combinations, Minimal SOP and POS forms, Tabular Method.

UNIT-III: Combinational & Sequential Circuits:
Design using conventional logic gates, Encoder, Decoder, Full Adders, Half Adders, Subtractors, Multiplexer, D-Multiplexers. Basic flip-flops-SRFF, JK-FF, T and D Type FF, Master slave FF, clocked Flip Flop; Triggering and excitation tables.

UNIT-IV: Basic Computer Organization & Design:
Instruction Codes, Computer registers, Common Bus system, instruction cycle, I/O & interrupt, Programming the Basic Computer, Machine language, Assembly language, One pass and Two pass assemblers, Instruction format, Addressing modes, Type of interrupts, RISC versus CISC architectures.

UNIT-V: Input-Output and Memory Organization:

Peripheral devices, I/O interfaces, asynchronous data transfer, modes of transfer, priority interrupt, DMA, I/O processor. Memory hierarchy, Main and auxiliary memory, Associative memory, cache memory, virtual memory.

TEXTBOOKS:

1. "Computer System Architecture", M. Moris Mano, 3rdEdition, PHI/Pearson, 2006.
2. "Computer Organization and Architecture", William Stallings7thEdition, PHI/Pearson, 2006.
3. "Switching & Finite Automata theory", ZviKohavi, TMH, 2ndEdition.
4. "Digital Design", Morris Mano, PHI, 3rdEdition, 2006.

REFERENCEBOOKS:

1. "Computer Organization", Car Hamacher, ZvonksVranesic & SafwatZaky, 5thEdition, TMH, 2002.
2. "Computer Architecture and Organization", JohnP. Hayes, TMH International Editions, 1998.
3. "Computer Architecture and Organization", RajKamal, Nicholas Carter, 2ndEdition, TMH Education, 2009
4. "Introduction to computer architecture", Stones S. Galgotia Publication
5. "Computer Organization and Architecture design for Performance", 4thedition- W. Stallings, PHI
6. "Computer Engineering-Hardware Design", M. Morris Mano,PHI
7. "Computer Architecture and parallel processing", Kai Hwang & FayeBriggs, Mc Grawhill, 1985
8. An Engineering Approach to Digital Design – Fletcher, PHI.
9. Malvino A.P, Digital Principles and Applications, Tata Mc Graw Hill.

B.Sc. SEMESTER-IV

BSC 204: INTRODUCTION TO DATA STRUCTURE AND OOPS

COURSE OUTCOMES:

Students, after completion of this course will be able to:

CO1: Understand object-oriented programming features in C++.

CO2: Apply these features to program design and implementation.

CO3: Understand object-oriented concepts and how they are supported by C++.

CO4: Understand the importance of data and be able to identify the data requirements for an application.

CO5: Have practical experience of implementing all kinds of data structures.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓									
CO2	✓			✓		✓				✓
CO3	✓		✓		✓		✓		✓	✓
CO4	✓	✓			✓		✓			✓
CO5	✓	✓	✓	✓		✓	✓	✓	✓	✓

BSC 204: Introduction to Data Structure and OOPS

UNIT-I

Introduction, Procedure-Oriented Programming paradigm, Object-Oriented Programming paradigm, Basic characteristics of OOP's: object, class, encapsulation, inheritance, reusability, polymorphism and overloading, static and dynamic binding, message passing, benefits of OOP"s and application of OOP's.

UNIT-II

C++ Basics: Overview, Syntax, Comments, Basic Data types, Tokens, identifiers, Keywords, Constants/Literals, Variables, Variable Scope, Modifier Types, Storage Classes, Operator, array, Strings, pointer, References, Date &Time, I/O statements, namespace, Program structure, typecasting, control statements: if statement, if- else statement, nested if-else statement, ladder if-else, switch statement, for loop statement, while loop statement, do-while loop statement.

UNIT-III

Objects and classes: Basics of object and class and abstract class in C++, private and public members, static data and function members, function prototype, inline functions. Introduction to: function overloading, friend functions, default arguments, constructors and destructors, inheritance and polymorphism.

UNIT-IV

Linear and Non linear data structures, Data structure operations, Algorithmic notations, Complexity of algorithms, Control structures. Memory representation and operations on: Arrays-One dimensional, Multi dimensional arrays. Linked List-Singly and Doubly Linear link lists, circular linked list Stack: PUSH, POP, TRAVERSE, implementations using array and linked list, Applications of stack: Infix, Prefix, Post fix representation and conversion using stack, Postfix expression evaluation using stack, use of stack in recursion, Polish notation. Queues: Priority Queue, Deques.

UNITV

Definition of trees and their types, Binary trees, Properties of Binary trees and Implementation operation (Insertion, deletion, searching and traversal algorithm:

preorder, post order, in-order traversal), Definition of, AVL Trees, B-trees, multi way search trees. Sorting: Sequential Sort, Insertion Sort, Selection Sort, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Radix sort. Linear or sequential search, Binary search.

TEXT/REFERENCEBOOKS:

1. "Data structures using C", Tenenbum, PHI, 1996
2. "Fundamentals of Data Structures", Horowitz and Sahani, Computer Science Press,1978
3. "Data structures and Algorithms", Aefred V.Aho, Jhon E.Joperoft and J.E. Ullman.
4. "An Introduction to Data Structures with Applications", Jean Paul Trembley and Paul Sorenson, TMH, International Student Edition,1985
5. "Data Structures and Program Design in C", R.Kurse, Leung &Tondo, 2ndEdition, PHI publication
6. Data Structures, Seymour Lipscutz, Schaum"sOutlines,TMH.

TEXT/REFERENCEBOOKS:

1. "Object-Oriented Programming with C++",E. Balaguruswamy, TMH
2. "C++The Complete Reference", Herbert Shildt, Osborne,TMH,latest
3. "Object-oriented programming with C++", Robert Lafore, Macmillan computer
4. "Tech yourself C++",Herbert Schildt, Osborne,TMH
5. "C&C++Complete reference", Herbert Shieldt, Osborne,TMH
6. "Object-Oriented programming in C++",Nabajyoti Barkakati, PHI
7. "C++ Primer Plus", Stephen Prata, Galgotia Publications,1996
8. "Object-Oriented analysis and Design with applications", Grady Booch.

LAB WORK:

Programming Lab in c++ and Data Structure

C++ Lab
1. Write a c++ program for finding greatest of three numbers.
2. Write a c++ program for solving the quadratic equation.
3. Write a c++ program to print all the prime numbers in the given range.
4. Write a c++ program for displaying the Fibonacci series.
5. Write c++ function for swapping two numbers without using third variable.
6. Write your own function for string reverse, string palindrome. string comparison.
7. Write a c++ program for sorting the number in ascending and descending order.
8. Write a c++ program for matrix addition and multiplication.
9. Write a c++ program for copy constructor and dynamic initialization of constructor.
10. Write a c++ program for array of pointers to objects.
11. Write a c++ program operator overloading using friend function.
12. Write a c++ program different types of inheritance using virtual base class.
13. Write a c++ program for run time polymorphism.
14. Write a c++ program to perform sorting using generic function(template).

Data Structure Lab

Linked List
1. Implementation of Linked List menu driven Program.
2. Representation of Sparse matrix using multi Linked Structure.Implimentation of Sparse matrix multiplication.
3. Implementation of polynomials operations(addition. subtractions) using Linked List.
4. Implementation of Double Ended Queue using Linked List.
5. Implementation of priority queue program using Linked List.

Stack
1.implementations of stack menu driven program.
2. implementation of multistack in one array.
3. Implementation of infix to post fix transformation and its evaluation program.
4. Implementation of infix to prefix transformation and its evaluation program.
5. Simulation of recursion.

ueue
1. Implementation of circular queue menu driven program.
2. Implementation of queue menu driven program.
3. Implementation of priority queue program using array.

ee
1. Implementation of binary tree menu driven program.
2. Implementation of binary tree traversal program.
3. Implementation of construction of expression tree using postfix expression.
4. Implementation of B tree menu dreiven program.
5. Implementation of B+ tree program.
6. Implementation of preorder traversal of a threaded binary tree.

ing and Searching program

B.Sc. SEMESTER-V

BSC 305: SYSTEM ANALYSIS AND DESIGN

COURSE OUTCOMES:

Students, after completion of this course will be able to:

CO1: Able to understand the principles and tools of systems analysis and design.

CO2: Able to understand the SDLC of system development in different context.

CO3: Understand and apply various software metrics on software quality products.

CO4: Perform software testing on various applications.

CO5: Able to understand the professional and ethical responsibilities system implementation and software documentation.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓		✓	✓			✓		✓	✓
CO2	✓		✓		✓		✓			✓
CO3	✓	✓	✓	✓	✓		✓	✓		
CO4	✓				✓	✓			✓	✓
CO5	✓	✓		✓		✓	✓	✓		✓

BSC 305: System Analysis and Design

UNIT-I

The system concept, Characteristics of a system, Elements of a system, types of system. Introduction to system development life cycle, Recognition of need, Skills and Role of system Analyst, Introduction to system analysis, Initial Investigation, determining the user's information requirements, problem definition.

UNIT-II

Introduction to structured analysis, fact-finding, the tools of structured analysis, Feasibility study, Cost/Benefit analysis.

UNIT-III

Introduction to system designs, The process of design (logical and physical design), Design methodology, structured design, structured walkthrough, Major development activities, Data validation, Introduction to input design, output design, forms design, File structure, File organization, Data Base design, and the role of DBA.

UNIT-IV

TheTestPlan,Qualityassurance,SystemConversion,Softwaremaintenance,Proced ureforHardware/Software selection, Project Management and Control, Project Control, Gantt Chart, PERT and CPM, System Security.

UNIT-V

Abstract view of components of computer system, Functions of operating system, Evolution of operating system, Batch; Time sharing, Real time operating system, Multiprogramming, Multiprocessing, Multiuser, Multi access. Introduction to UNIX.

TEXTBOOKS:
1. System Analysis and Design, Elias. M.Awad, Galgotia Publication.
2. Fundamentals of Computers, V. Rajaraman, PHI.
3. "Operating Systems: Concepts & design" Milan Milenkovic, TMH4.

REFERENCEBOOKS:
1. Kendall and Kendall, System analysis and Design, PHI.
2. Igor Hawryszkiewycz, Introduction to System analysis and Design,PHI

B.Sc. SEMESTER-VI

BSC 306: DATABASE MANAGEMENT SYSTEM AND WEB TECHNOLOGY

COURSE OUTCOMES:

Students, after completion of this course will be able to:

CO1: Acquire knowledge of basic Database design.

CO2: Gain Knowledge about Relational Model.

CO3: Analyze & learning with Database design concept.

CO4: Understand the importance of Normal forms.

CO5: Understand the implementation of Transaction Processing techniques.

CO-PO MAPPING

CO	PO									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	✓			✓		✓				
CO2	✓		✓		✓					✓
CO3	✓	✓	✓		✓		✓	✓	✓	
CO4	✓	✓					✓			✓
CO5	✓	✓	✓	✓		✓			✓	✓

BSC 306: Database Management System and Web Technology

UNIT-1

Introductory Concepts: Database system concepts and architecture Database System Applications, Database systems versus File system, View of data, Data Models, Database Languages (Data definition language and Data Manipulation Language), Database Users and Administrators (Database Users and User Interface), Database Administrator, Database System Structure (Storage Manager, Query Processor), Application Architectures, History of Database Systems.

UNIT-2

Data Models: ER Modeling concepts, Entity Sets, Relationship Sets, Constraints, Keys, Mapping Cardinalities, ER Diagrams,
Extended ER feature, Weak-entity types, Subclasses and inheritance, Specialization, Generalization and Aggregation, ER to relational mapping, Reduction of an E-R schema to tables. Composite and Multivalve Attributes.
RELATIONAL MODEL: Structure Of relational Databases, Database Schema, Keys, Schema Diagram, Query Languages,
Relational ALGEBRA: Basic Relational Algebra Operation, Select, Project, Union, Cartesian product, Intersection, Join, Natural join, Division, Tuple and Domain Relational Calculus.
SQL: Parts and structure of SQL, Aggregate Function, Data definition in SQL, Queries and update statements, Integrity and Security: Domain Constraints, Referential Constraints, Assertions, Triggers, Security and Violations, Authorization, Granting Of Privileges, Notion of Roles, Audit Trails, Authorization in SQL, Privileges in SQL, Role, Privilege to Grant Privileges, Encryption and Authentication.

UNIT-3

Database Design Using the Relational Model: Functional dependencies: Keys in a relational model, Concept of functional dependencies, Normal forms 1NF, 2NF, 3NF, Boyce-Codd Normal Forms, Multi-values dependencies and fourth normal form, Join dependencies and fifth normal form.

UNIT-4

Storage and Indexing Structures: Storage structures Secondary storage devices, Buffering of blocks, File Organization, Heaps, Sorted Files, Hashing

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and overflow handling techniques, dynamic hashing, Extensible hashing, other file organization and Indexing.

Transaction Processing, Concurrency Control and Recovery Technique:
Transaction Fundamentals, Transaction State, Shadow copy technique, Concurrent Execution, Serializability, ACID properties Locks, Lock based Protocols, Two Phase Locking Protocol, Timestamp Based Protocol, Deadlocks and starvation, Two-phase locking (2PL) protocol, Deadlock prevention protocols, Wait-die and wound-wait schemes, Time-out based schemes, Deadlock recovery, Recovery concepts, Failure classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery, Deferred updates technique, immediate update technique, Check Points, Shadow paging.

UNIT-5

RDBM software ORACLE: Introduction to Oracle, Data Types, SQL, SQL Plus, **DDL & DML**: Creating Table, Specifying Integrity Constraint, Modifying Existing Table, Dropping Table, Inserting Deleting and Updating Rows in table, where clause, Order by, GROUP function, **SQL function**: JOIN, Set Operation, SQL Sub Queries. **Views**: Creating, Dropping, and retrieving data from view. **Security:** Management Of roles, Granting Role & Privilege, Drawing Privilege. **PL/SQL:** Block structure in PL/SQL, Variables and constants, Database Access, Exception Handling, and Triggers.

TEXT/REFERENCE BOOKS:

1. "Fundamentals of Database System", R. Elmasri & S. Navathe
2. "Data Base Management System", Henry F. Korth & Abraham Silberschats, TMH, 1991.
3. "An Introduction to Database Management System", Vol I &II, Date C.J., Addison Wesley, 1981,1983
4. Object Oriented Database: Persistent Programming Language, Object identity and its implementation, Clustering Indexing, Client Server Object Bases Coherence.
5. Database Transaction Models for Advanced Applications: Ahmed K.Elmagramid (MorganKaufmann)

RDBMS & WEB Programming Lab with PHP

RDBMS Lab

1. Practical based on PL/SQL (suing oracle).
2. Perform DDL, DML and DCL operations.
3. Cursor, Procedure, Trigger.

Web Programming with PHP

Web application development using PHP

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