

TUMKUR UNIVERSITY



Syllabus as per CBCS 2016-2017 under Semester Scheme

Bachelor of Computer Applications (BCA)

Computer Science (BCA)

FIRST SEMESTER

BCACsT1.1: Programming concepts using C.

BCACsP1.2: C programming lab

BCACsT1.3: Operating system

BCACsP1.4: DOS & Ms-office lab

BCACsT1.5: Computer Hardware and Networking

BCACsP1.6: Computer Hardware Lab

SECOND SEMESTER

BCACsT2.1: Database management systems

BCACsP2.2: DBMS lab

BCACsT2.3: Digital electronics

BCACsP2.4: Digital electronics lab

BCACsT2.5: Data structure using C

BCACsP2.6: Data structures using C lab

THIRD SEMESTER

BCACsT3.1: Computational Numerical Techniques

BCACsP3.2: Numerical analysis lab

BCACsT3.3: Object oriented programming using C++

BCACsP3.4: C++ using oops lab

BCACsT3.5: Internet Programming

BCACsP3.6: HTML & XML lab

FOURTH SEMESTER

BCACsT4.1: Computer networks and data communication

BCACsP4.2: Static website project lab

BCACsT4.3: UNIX operating system

BCACsP4.4: UNIX lab

BCACsT4.5: ADA

BCACsP4.6: ADA lab

Computer Science (BCA) Syllabus -2016

ABSTRACT

SEM	PAPER CODE	PAPER NAME	HRS / WEEK	EXAM HRS	MAX.MARKS		
					INT. MARKS	EXT. MARKS	TOTAL
I	BCACsT1.1	Programming concepts using C	04	03	10	90	100
	BCACsP1.2	C programming lab	04	03	-	50	50
	BCACsT1.3	Operating System	04	03	10	90	100
	BCACsP1.4	DOS & MS-Office lab	04	03	-	50	50
	BCACsT1.5	Computer Hardware and Networking.	04	03	10	90	100
	BCACsP1.6	Computer Hardware Lab	04	03	-	50	50
2	BCACsT2.1	Database management systems	04	03	10	90	100
	BCACsP2.2	DBMS lab	04	03	-	50	50
	BCACsT2.3	Digital electronics	04	03	10	90	100
	BCACsP2.4	Digital electronics Lab	04	03	-	50	50
	BCACsT2.5	Data structure using C	04	03	10	90	100
	BCACsP2.6	Data structures using C lab	04	03	-	50	50
3	BCACsT3.1	Computational Numerical Techniques	04	03	10	90	100
	BCACsP3.2	Numerical analysis lab	04	03	-	50	50
	BCACsT3.3	Object oriented programming using C++	04	03	10	90	100
	BCACsP3.4	C++ using oops lab	04	03	-	50	50
	BCACsT3.5	Internet Programming	04	03	10	90	100
	BCACsP3.6	HTML & XML lab	04	03	-	50	50
4	BCACsT4.1	Computer networks and data communication	04	03	10	90	100
	BCACsP4.2	Static website Lab	04	03	-	50	50
	BCACsT4.3	UNIX operating system	04	03	10	90	100
	BCACsP4.4	UNIX lab	04	03	-	50	50
	BCACsT4.5	ADA	04	03	10	90	100
	BCACsP4.6	ADA lab	04	03	-	50	50

Question Paper Pattern

Duration: 3 Hrs.

Max. Marks: 90

- | | |
|--|----------------|
| I. Answer any 10 Questions out of 12: | (10 x 01 = 10) |
| II. Answer any 5 questions out of 07: | (05 x 03 = 15) |
| III. Answer any 6 questions out of 08: | (06 x 05 = 30) |
| IV. Answer any 5 questions out of 07: | (05 x 07 = 35) |

1st Sem BCA

Paper: BCCsT1.1: PROGRAMMING CONCEPTS Using C

4 Hrs /Week

Total: 60 Hrs

- ❖ **Chapter 1: Introduction to Computer Programming:** **3 Hrs**
Steps in problem solving, program design tools, basic control structures, structured programming.
- ❖ **Chapter 2: Overview of C** **6 Hrs**
Introduction, importance of C, sample C program, basic structure of C program, programming style, executing a C program. Constants, variables and data types. Introduction, C character set, C tokens, identifiers, constants, variables, data types, declaration of variables, assigning values to variables, defining symbolic constants.
- ❖ **Chapter 3. Operators and expressions** **4 Hrs**
Operators in C, arithmetic operators, relational operators. Logical operators, assignment operators, increment and decrement operators, conditional operators, bitwise operators, special operators, precedence of arithmetical expression, relational expression, logical expressions, type conversion in expressions, operator precedence.
- ❖ **Chapter 4. Managing input and output operations** **4Hrs**
Input and output statements, reading a character: getch(), getche(), writing a character: putchar(), putch(), formatted i/o statements.
- ❖ **Chapter 5. Decision making, Branching and looping** **6Hrs**
Control instructions: decision control structures: if, if-else, nested if, else-if ladder, switch. The goto statement, conditional operator, loops: while, do-while and for loop. Jump statements, nested loops.
- ❖ **Chapter 6. Arrays** **9 Hrs**
Introduction, single dimensional array, two-dimensional arrays, initializing 2-d arrays, multidimensional arrays. Operations on arrays: traversal, insertion and deletion. Searching: linear search & binary search. Sorting: bubble sort, selection sort and insertion Sort.
- ❖ **Chapter 7. Strings** **8 Hrs**
Declaring and initializing string variables, reading string from terminal, writing string to screen, putting strings together. Comparison of two strings, length of a string, copying a string, string operations using library functions & User defined functions. Operations on characters.
- ❖ **Chapter 8. Functions** **5Hrs**
Introduction, types of functions, need for user-defined functions, function call, types of arguments, nesting of functions, a multi function program, recursion, storage classes, passing arrays to functions.

❖ **Chapter 9. Structures and unions:** **6Hrs**

Definition and declaration of a structure, assigning and accessing the members of a structure, structure initialization, structure elements in memory, comparison of structure variables, structure with in the structure, array within structures, unions, type def and enum.

❖ **Chapter 10. Pointers** **5Hrs**

Advantages of pointers, declaration of pointer variable, pointer expressions, pointers and functions: calling function by value and call by reference, pointers and arrays, array of pointers, pointer to pointer.

❖ **Chapter 11. Files** **4Hrs**

Definition, types of files. Creating text file. Modes of opening a file, formatted and unformatted i/o operations, random files.

Reference Books:

1. E. Balaguruswamy : Programming in ANSI C” Tata Mc Graw-Hill
2. Problem Solving with C -PHI(EEE). By - M.T.Somashekara.
3. Kamthane, Programming with ANSI and Turbo C. Pearson Education
4. V. Rajaraman.: “Programming in C”, PHI (EEE) (2000)
5. S. ByronGottfried. : “Programming with C”, Tata McGraw-Hill(2000)
6. Yashawant Kanetkar : “Let us C”
7. Brain Verminghan & Dennis M. Ritchie “ANSI C Programming” (PHI)
8. Ramkumar & Rakesh Aggarwal “ANSI C Programming” Tata McGraw Hill
9. Kernigham, C Programming Language ANSI C Version. Pearson Education.
10. Venkateshmurthy, Programming Techniques through C. Pearson Education.

**Paper: BCACsP1.2 :C PROGRAMMING Lab
Practical**

4 Hrs/Week

Total Marks: 50

1. Write a program to find largest of 3 numbers using if-else statement.
2. Write a program to check whether given character is vowel or not using switch-case.
3. Write a program to find sum of digit of a given number using do-while loop.
4. Write a program to find the factorial of a number.
5. Write a program to generate and print first n fibonacci numbers.
6. Write a program to find whether a given number is prime number or not.
7. Write a program to insert an element into an array.
8. Write a program to delete an element from an array.
9. Write a program to check whether the given matrix is identity or not.

10. Write a program to print the product of two given matrices of $n \times n$.
11. Write a program to check whether a given string is palindrome or not.
12. Write a program to sort the given n names using bubble sort technique.
13. Write a program to search an element from an array using linear search.
14. Write a program to accept a string and reverse it by using pointers.
15. Write a program to swap two integers using call by value and address.

Scheme for Practical Examination

1.	Writing Two programs	:	10 Marks
2.	Execution of two programs	:	30 Marks
3.	Practical record	:	05 Marks
4.	Viva Voce	:	05 Marks
	Total	:	50 Marks

Note

1.	Internal Assessment for each paper(Theory)	:	10 Marks
2.	Practical Examination of 3 hours duration	:	50 Marks
3.	Theory Examination of 3 hours duration	:	90 Marks
	Total	:	150 Marks

1st Sem BCA
Paper: BCACsT1.3: Operating System
Theory

4 Hrs /Week

Total: 60 Hrs

❖ **Chapter 1: Introduction**

6Hrs.

Batch Systems, Concepts of Multiprogramming and Time Sharing, Parallel, Distribute and real time Systems, operating System Structures, Components and Services, System calls, System programs, Virtual machines.

❖ **Chapter 2: Process Management**

9Hrs.

Process Concept, Process Scheduling, Co-Operating process, Threads, Inter process communication, CPU Scheduling Criteria, Types of Schedulers, Scheduling algorithm, Multiple Processor Scheduling, Real time Scheduling, Algorithm evolution.

❖ **Chapter 3 : Process Synchronization and Deadlocks**

11Hrs.

The Critical Section Problem, Synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, monitors, Dead locks– System model, Characterization, Dead lock prevention, avoidance and detection, Recovery from dead lock, Combined approach to deadlock handling.

❖ **Chapter 4: Memory Management**

12Hrs.

Logical and Physical address space, Swapping, Contiguous allocation, Paging, Segmentation, Segmentation with paging in Mastics and Intel 386, Virtual memory –Demand paging and its performance, Page replacement algorithms, Allocation of frames, thrashing, page size and other considerations. Demand Segmentation.

❖ **Chapter 5 : File Management (Systems, Secondary Storage Structure**

8Hrs.

File Concepts, Access methods, Directory Structure, Protection and Consistency Semantics, File system structure, allocation methods, Free space management, Directory Implementation, Efficiency and Performance, Recovery.

❖ **Chapter 6 : Disk Management (Structure, Disk Scheduling Methods)**

7Hrs.

Disk Structure and Scheduling methods, Disk management, Swap-Space management.

❖ **Chapter 7: Protection and Security**

7Hrs.

Goals of protection, Domain Protection, Access matrix, Security Problem, Authentication, One time password, program threats, System threads.

Reference Books:

1. Abraham Silberschatz and Peter Baer Galvin, Operating System Concepts, Fifth Edition, Addison-Wesley 1999
2. Nutt: Operating Systems, 3/e Pearson Education 2004
3. Milan Milonkovic, Operating System Concepts and design, II nd Edition, McGraw Hill 1992.
4. Richard Peterson, Linux-The complete reference.
5. Tanenbaum, Operation System Concepts. Pearson Education.

**Paper BCACsP1.4: DOS & MS-Office Lab
Practical**

4 Hrs/Week

Total Marks: 50

❖ **Disk Operating System (DOS)**

1. Learn internal commands with their syntax

- | | |
|-------------|---------|
| a) cls | g) time |
| b) copy con | h) cd |
| c) REN | i) rd |
| d) Del | j) vol |
| e) MD | k) Ver |
| f) date | l) copy |

2. Learn External commands with their syntax

- | | |
|-----------|------------|
| a) EDIT | f) MORE |
| b) FORMAT | g) BACKUP |
| c) TREE | h) DELTREE |
| d) CHKDSK | i) XCOPY |
| e) SORT | |

❖ **MS Word**

1. Design your College banner.
2. Create a document of your **C PROGRAMMING Syllabus**. Perform the following features: Cut, Copy, Paste, Bold, Italic, Underline, Indentation, Font size, Color change, Paragraph alignment, Line spacing, Bullets and Numbering.
3. Write an appointment letter for Marketing Executive of “ABC Company” using the company’s letter head.
4. Using Clip Art & WordArt insert images in your document and design it with text special effects and back ground effects.
5. Write your bio-data using formatting tools – colors, numbers/bullets, alignment, and border.
6. Write a birthday invitation to your friends using mail merge.
7. Create a macro to print your College name “.....”.
8. Design your college timetable using Table and its formatting features.

❖ **MS Excel**

1. Design your class time table.
2. Prepare a mark sheet of your class subjects.
3. Prepare a salary slip of an employee.
4. Prepare a bar chart & pie chart for the analysis of Election results.
5. Prepare a generic bill of a super Market.
6. Work on the following exercise on a Workbook:
 - a) Copy an existing Sheet
 - b) Rename the old Sheet
 - c) Insert a new Sheet into an existing Workbook
 - d) Delete the renamed Sheet.
7. Prepare an attendance sheet of 10 students for any 5 subjects of your syllabus. Calculate their total attendance, total percentage of attendance of each student & average of attendance. [Hint: Use excel in-built functions.]
8. Create a worksheet on students list and perform the following database functions:-
 - a) Sort data by name
 - b) Filter data by class
 - c) Subtotal of No. of students in a class.

❖ **MS-Power Point:**

Creating new slides, formatting slide layout, slide show & sorter, inserting new slide, slide no., date, time, chart and other tool operations.

❖ **Internet concepts:**

To create an email-id, To compose and send a mail, To forward a mail and to reply for a mail, To send a mail with an attachment, To download the attached document of a mail received, To send a mail to a large number of recipients using cc and bcc options, To search a thing using a search engine, To verify a university /college details by opening their websites, To upload your resume with any one job portal.

Scheme for Practical Examination

1. Writing Two programs	:	10 Marks
2. Execution of two programs	:	30 Marks
3. Practical record	:	05 Marks
4. Viva Voce	:	05 Marks
Total	:	50 Marks

Note

1. Internal Assessment for each paper(Theory)	:	10 Marks
2. Practical Examination of 3 hours duration	:	50
Marks		
3. Theory Examination of 3 hours duration	:	90
Marks		
Total	:	150 Marks

1st Sem BCA

**Paper: BCACs1.5 Computer Hardware & Network
Theory**

4 Hrs/week

Total Hrs: 60

❖ **Chapter 1: Introduction to computers** **12 Hrs**

Introduction, History of computer, Block diagram of computer, Generation of computer, Classification of computers (based on working principle, size and capability), Characteristics of computer, Applications of computer. Human Computer Interface: Types of software, Operating system as user interface, utility programs, Number System.

❖ **Chapter 2 : Input & Output Devices** **12 Hrs**

Components of computer system, Input Devices : wired/wireless, Keyboard, Mouse, Joystick, Scanner, Digitizers, Light pen, Touch screen, Barcode scanner, Output Devices, Monitor(CRT,LCD,LED), Printer, Dot Matrix, Inkjet, Laser, Thermal, Plotter, Barcode Printers, Sound devices, Speaker, Headphone, Bluetooth, Dongle.

❖ **Chapter 3 : Memory Management Techniques** **10 Hrs**

Types and characteristics, Classification, Semiconductor, Magnetic, Optical ROM and its types, RAM and its types: SDRAM, EDORAM, DDR Series, Flash RAM. Secondary Memory, Hard Disc Drive, Floppy Disc, CDROM, DVD, Pen Drive, flash memories: Mini/micro , SD Card Formatting and Utility Tools.

❖ **Chapter 4 : Computer Organization and Architecture:** **6 Hrs**

C.P.U., registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.

❖ **Chapter 5: Computer Networks** **10 Hrs**

Introduction to computer network, data communication, components of data communication, data transmission mode, LAN (**LAN Topologies:** Ring, bus, star, mesh and tree topologies), MAN, WAN.

❖ **Chapter 6 : Transmission Media & Network devices** **10 Hrs**

Introduction, Guided Media: Twisted pair, Coaxial cable, Optical fiber. Unguided media: Microwave, Radio frequency propagation, Satellite. **Network Devices:** NIC, repeaters, hub, bridge, switch, gateway and router. OSI, TCP/IP, layers and functionalities.

Reference Books:

1. Computer Fundamentals: N. Mithili Devi and E. Padma Sri, SKYWARD Publishers.
2. Introduction to computer concepts: Pearson publication.
3. Computer Fundamentals: Anita Goel, Pearson publication.

4. Fundamentals of Computers - V. Rajaraman.: PHI (EEE)
5. Network Flows: Theory, Algorithms, and Applications by Ravindra K. Ahuja, Thomas L. Magnanti, James B. Orlin. 1993.
6. Computer Networks 2013by Andrew S. Tanenbaum

**Paper BCCsP1.6 : Computer Hardware Lab
Practical**

4 Hrs/Week

Total Marks: 50

1. Draw the block diagram of the computer and tabulaty mention the basic configuration of present PC.
2. Study the peripheral device (Keyboard, Mouse, Monitor, Printer).
3. Study of the CPU cabinet with its front and back view (Brief Explanation of SMPS).
4. Study the overview of Motherboard and Microprocessor.
5. To study the Memory
 - RAM
 - ROM
 - DDR Series
 - Hard disk, CD and DVD
6. Study the different types of ports, Cable and Connectors
 - Serial and Parallel port
 - PS/2 Port
 - VGA Port
 - DVI Port
 - Audio Ports
 - Expansion Slots
7. DOS based practical Internal and External commands.
8. Desktop and control panel settings of windows operating system.
9. Assembling and disassembling the system hardware components of the personal computer
10. Format the System. Installation of software and anti-virus software.

Scheme for Practical Examination

1. Writing Two programs	:	10 Marks
2. Execution of two programs	:	30 Marks
3. Practical record	:	05 Marks
4. Viva Voce	:	05 Marks
Total	:	50 Marks

Note

1. Internal Assessment for each paper(Theory)	:	10 Marks
2. Practical Examination of 3 hours duration	:	50 Marks
3. Theory Examination of 3 hours duration	:	90 Marks
Total	:	150 Marks

2nd Sem BCA

Paper: BCACsT2.1 DATABASE MANAGEMENT SYSTEMS

4 Hrs /Week

Total: 60 Hrs

- ❖ **Chapter 1. Introduction** **6Hrs**
Basics of database, traditional file oriented approach, database and database users, characteristics of the database approach, different people behind DBMS, implications of database approach. Advantages and disadvantages of using DBMS, database administrator (DBA), when not to use a DBMS.
- ❖ **Chapter 2. Database System Concepts and Architecture** **5Hrs**
Introduction, data models, schemas, and instances. Different types of data models, DBMS architecture (logical and physical) and data independence. Database languages, DBMS interfaces. The database system environment, distributed DBMS, client-server architecture, classification of database management systems.
- ❖ **Chapter 3. Data Modeling Using the Entity-Relationship Model** **5Hrs**
Introduction, high level conceptual data models for database design with an example. Entity and attributes, types of attributes, entity types, entity sets and keys, ER model concepts, notation for ER diagram, E.F. Codd rules, cardinality. Abstraction and aggregation.
- ❖ **Chapter 4. Functional Dependencies and Normalization** **7Hrs**
Introduction, relational model constraints, basic terms, database design, database anomalies, informal design guidelines for relational schemas, decomposition, functional dependencies, normal forms based on primary keys, normalization: first, second and third normal forms and Boyce-Codd normal form.
- ❖ **Chapter 5. Relational Database Language** **10Hrs**
Introduction, differences between DBMS and RDBMS, basic terminologies used in RDBMS, introduction to SQL, advantages and disadvantages, data types, types of SQL statements, DDL statements: create, alter, drop, truncate, DML statements: insert, delete, update and Select. DCL statements: commit, rollback, save point and DCL statement: grant and revoke queries on the database, operators used in SQL, distinct clause, set operators, SQL alias, SQL dual table, SQL functions, order by and having clause, joins, sub queries, indexes and views in SQL.
- ❖ **Chapter 6. Relational Data Model and Relational Algebra** **5Hrs**
Introduction to the relations model concepts. Relational model: constraints and relational database schema, operations on relations: retrieval and update.
Relational algebra: types of operations on relational algebra, unary operations: select and project, binary relational operations: union, intersect and minus, relational algebra on set theory: Cartesian product, additional relational operations aggregate functions and grouping,

examples of queries in the relational algebra. Relational database design using E R diagram.

❖ **Chapter 7: PL/SQL** **12 Hrs**

Introduction, PL/SQL architecture, features of PL/SQL, advantages of PL/SQL over SQL, PL/SQL blocks: named and unnamed, comments in PL/SQL, PL/SQL language fundamentals, structure of PL/SQL program, display output from PL/SQL, PL/SQL execution, overview of PL/SQL control statements : conditional, iterative and sequential statements , procedures and functions, packages, exception handling, database triggers, cursors. Programs on named and unnamed blocks.

❖ **Chapter 8 : Record Storage and Primary File Organization** **5Hrs**

Introduction, buffering of blocks, operations on files, file organization: files of unordered records: heap files, files of ordered records (sorted files)), hashing techniques, other primary file organization, parallelizing disk access using RAID technology.

❖ **Chapter 9:Transaction Processing Concepts:** **5Hrs**

Introduction, transaction and system concepts, desirable properties of transaction, transaction support in SQL, locking techniques for concurrency control, concurrency control techniques.

Reference Books:

1. Elmasri and Navathe, Fundamentals of Database Systems (4th Edition), Pearson Education, 2003
2. Sundrraman, Oracle 9i programming A Primer, 1/e Pearson Education.
3. Kahate, Introduction to Database Management System, Pearson Education 2004.
4. Abrahamsi, Silberschat, Henry. F. Korth, S. Sudarshan, Database System Concepts,Mc.graw hill.
5. Jefry. D. Ullman, Principles of database system.
6. Oracle Press” ORACLE-Complete reference
7. C.J. Date, Introduction to database systems, Sixth Edition, Addison Wesley, 1995.
8. Raghu Ram Krishan, Database Management Systems, Second Edition,. Mc. Graw Hill, 2000

**Paper: BCACsP2.2 DBMS Lab
Practical**

4 Hrs/Week

Total Marks: 50

- 1. The Student detail database has a table with the following attributes. The primary keys are underlined.**

Student (regno number, name varchar2, dob date, marks number)

- Create the above table.
- Remove the existing attribute marks from the table.
- Change the data type of regno from number to varchar2.
- Add a new attribute phno to the existing table.
- Enter 5 tuples into the table.
- Display the tuples in table

- 2. A Library database has a table with the following attributes. Library (bid number, title varchar2, author varchar2, publisher varchar2, yearof_pub number, price number)**

- create the above table.
- Enter 5 tuples into the table.
- Display all the tuples from the table.
- Display different publishers from table.
- Arrange the tuples in the alphabetical order of book title.
- List the details of all books whose price range between 100rs and 300rs.

- 3. The Emp salary database of an organization has a table with the following attributes.**

Empsal (Empcode number, Ename varchar2, dob date, dept varchar2, salary number(10,2))

- Create the above table.
- Enter 5 tuples into the table.
- Display the no of employees working in each dept.
- Find sum of the salaries of all employees.
- Find highest and lowest salary of all employees.
- Find the sum and average salaries of employees of a particular department.
- Increase the salary of those employees working for the "computer science" dept.

- 4. An Inventory database has the following table.**

Items (itemcode number, name varchar2, price number)

Purchase (itemcode number, qty number)

- Create the tables with the above attributes.
- Enter 5 tuples into the tables.
- List the items purchased.
- List the items which are not purchased by anyone.

- 5. Consider the Insurance database given below. The primary keys are underlined and data types are specified.**

Person (driverid varchar2, name varchar2, address varchar2)

Car (regno varchar2, model varchar2, year number)

Owns (driverid varchar2, regno varchar2)

**Accident (reportno number, accdte date, location varchar2)
Participated (driverid varchar2, regno varchar2, reportno number, dmgamt number).**

- Create all tables.
- Enter at least 5 tuples for each table.
- Update the damage amount for each car accident.
- Add a new accident to the database.
- Find the total no of people who owned cars that were involved in accidents in the particular year.
- Find the no of accidents in which cars belonging to a specific model were involved.

6. A Bank database has 2 tables Customer and Account.

Account (accno number, acctype varchar2, branch varchar2, accstatus varchar2, chequef varchar2)

Customer (custno number, cname varchar2, city varchar2, accno number, balance number)

- Create the above tables and specify the primary and foreign keys.
- Enter 5 tuples for each table.
- List the customers from “Bangalore” who have been cheque facility.
- List all the customers whose balance is > 3000 and have an active account.
- Find the current outstanding balance amount of branch “malleswaram”.

7. Consider the following database of Student enroll has the following tables with attributes.

Student (regno number, name varchar2, major varchar2, dob date)

Course (cno number, cname varchar2, dept varchar2)

Enroll (regno number, cno number, sem number, tmarks number)

Tbook (bkno number, title varchar2, publisher varchar2, author varchar2) **Bk_adpt (cno number, bkno number, sem number)**

- Create all the tables.
- Enter 5 tuples for each table.
- Insert a record into the tbook table.
- Insert a record into bk_adpt table.
- List the students registered but not enrolled.
- List the books which have been adopted.

8. Consider the following an Order processing data base application in a company.

Customer (custid number, cname varchar2 ,city varchar2)

Corder (orderno number, ordate date, custid number, oramt number)

Item (itemno number, name varchar2, price number)

Oritem (orderno number, itemno number, qty number)

Warehouse (whno number, city varchar2)

Shipment (orderno number, whno number, shipdate date)

- Create all the tables.
- Enter 5 tuples for each table.
- List the orderno for the order that were shipped from the all the ware houses that the company has in a specific city.
- Demonstrate the delete of itemno 21 from item table and make that field “null” in the or item table.

9. Write a PL/SQL Program to find largest of 2 numbers using if statement.
10. Write a PL/SQL Program to find the sum of first 10 natural numbers using Loop structure.
11. Write a PL/SQL Program to find factorial of a given number.
12. Write a PL/SQL Program to Create a Procedure to add 2 numbers.

Scheme for Practical Examination

1. Writing Two programs	:	10 Marks
2. Execution of two programs	:	30 Marks
3. Practical record	:	05 Marks
4. Viva Voce	:	05 Marks
Total	:	50 Marks

Note

1. Internal Assessment for each paper(Theory)	:	10 Marks
2. Practical Examination of 3 hours duration	:	50 Marks
3. Theory Examination of 3 hours duration	:	90 Marks
Total	:	150 Marks

2nd Sem BCA
Paper: BCACsP2.3 DIGITAL ELECTRONICS
Theory

4 Hrs /Week

Total: 60 Hrs

❖ **Chapter 1:Introduction: 6 Hrs**

Electronics and its components-Resistors, capacitors, diodes transistors , Analog and Digital electronics and its application, Wave forms types and its characteristics, Logic-families-Scale of integration, digital IC's, classifications, DTL, TTL, ECL, MOS, CMOS, mention features: speed of operation, power dissipation, propagation delay, fan-in, fan-out.

❖ **Chapter 2: NUMBER SYSTEMS AND BOOLEAN ALGEBRA 10 Hrs**

Introduction to number systems – positional and non-positional, base of a number system.. Decimal number system: definition, digits, binary number system: bit, byte, conversions: binary to decimal and decimal to binary. Octal number system: conversion from octal to decimal, decimal to octal, octal to binary and binary to octal. Hexadecimal number system: conversions- decimal to hexadecimal, hexadecimal to decimal, hexadecimal to binary, binary to hexadecimal, octal to hexadecimal , hexadecimal to octal. Binary arithmetic operations - binary addition, subtraction, multiplication and division (only integer part). 1's and 2's complement – 2's complement subtraction (only signed numbers).

Binary codes: BCD code, 8421 code, examples and applications. **Gray code** - Conversions - Gray to binary and Binary to Gray, application of gray code (Mention only). **Excess – 3 code** - Self complementing property and applications. Definition and nature of ASCII code. Introduction to **error detection and correction code**, parity check.

❖ **Chapter 3: BOOLEAN ALGEBRA 12 Hrs**

Laws and Theorems. AND, OR, NOT Laws, Commutative law, associative law, distributive law.

Demorgan's theorems – Statements, proof using truth tables; simplification of Boolean expressions using Boolean laws. Definition of product term, sum term, minterm, maxterms, SOP, standard SOP, POS and Standard POS. Conversion of Boolean expression to standard SOP and standard POS forms. Karnaugh maps- Definition of Karnaugh map, K- map for 2, 3 and 4 variables. Conversion of truth tables into k-map, grouping of cells, redundant groups and don't care conditions. Karnaugh map technique to solve 3 variable and 4 variable expressions. Simplification of 3 and 4 variable Boolean expression using K-maps (SOP only).

❖ **Chapter 4: LOGIC GATES AND COMBINATIONAL LOGIC CIRCUITS 16 Hrs**

AND gate: definition, symbol, truth table, timing diagram, Pin diagram of IC 7408. OR gate: definition, symbol, truth table, timing diagram, Pin diagram of IC 7432. NOT gate: definition, symbol, truth table, timing diagram, Pin diagram of IC 7404. NAND gate: Definition, symbol, truth table, Pin diagram of IC 7400. NOR gate: Definition, symbol, truth table, timing diagram, Pin

diagram of IC 7402. Exclusive OR gate: definition, symbol, truth table, timing diagram, applications, Pin diagram of IC 7486. Exclusive NOR gate: definition, symbol, truth table, timing diagram.

Combinational logic circuits: Definition, applications. half adder: symbol, logic circuits using XOR and basic gates, truth table. Full adder: symbol, logic circuits using XOR and basic gates, truth table. Half subtractor: symbol, logic circuits using XOR and basic gates, truth table. Full subtractor: symbol, logic circuits using XOR and basic gates, truth table. Adder - Subtractor: Logic circuit using IC 7483, IC 7486. Parallel Adder: 4 - bit parallel binary adder, BCD adder using IC 7483.

Multiplexer: Logic symbol, 4:1 and 8:1 multiplexers-logic circuits using gates, truth table and applications.

De-Multiplexer: Logic symbol, 1:4 and 1:8 de-multiplexers: logic circuits using gates, truth table and applications.

Decimal to BCD Encoder: Logic symbol, truth table and applications.

BCD to decimal Decoder- logic symbol, IC 7445-Pin diagram, truth table and applications .

❖ Chapter 5: SEQUENTIAL LOGIC CIRCUITS

16 Hrs

Importance of clock in digital circuit and **Introduction to flip flop**. Difference between latch and flip-flop. Qualitative study of level and edge triggering. RS latch / unlocked, symbol and truth table. **RS flip-flop** using NAND gate, symbol, truth table and timing diagram. **D flip-flop**- Logic symbol, RS flip-flop as a D flip flop, truth table and timing diagram. **J-K flip-flop**- Symbol, truth table, Realization of JK flip-flop using NAND gates, working, and timing diagram. Race around condition, preset and clear inputs. **T flip flop** - Logic symbol, JK flip flop as a T flip-flop, truth table and timing diagram. **JK Master Slave flip flop:** Logic circuit, truth table and timing diagram, advantage of M/S flip flop.

Registers: Definition, types of registers - Serial in serial out, Serial in parallel out, Parallel in serial out, Parallel in parallel out shift register (Block diagram representation for each), truth table, timing diagram and speed comparison.

Reference Books:

1. Principles of Electronics by V. K Mehta by S Chand.
2. Digital Principles and Applications by Albert Paul Malvino and Donald P. Leach, Fourth Edition, TMH .
3. Digital Electronics: An Introduction to Theory and Practice by William H Gothmann, 2nd Edition, PHI.
4. Morris Mano, "Digital Logic and Computer Design", PHI Publications.
5. R. P. Jain, "Modern Digital Electronics", TMH, 3rd Edition.
6. Digital Fundamentals. Floyd, 3rd Edition.

**BCACs2.4 Digital Electronics Lab
Practical**

4Hrs/Week

Total Marks: 50

1. Study of logic gates: AND, OR, NOT, NAND, NOR, XOR using respective ICs
2. Realization of AND,OR and NOT gates using IC 7400.
3. Realization of AND,OR and NOT gates using IC 7402.
4. Design and realization of Half Adder/Subtraction using NAND Gates.
5. Design and realization of Full Adder using Logic Gates.
6. Design and realization of 4 bit Adder/subtraction using IC 7483.
7. Design and realization of BCD Adder using IC7483.
8. Realization of R-S and D flip-flop using NAND gates.
9. Realization of J-K flip-flop using IC 7400 and 7410.
10. Realization of T and D flip-flops using IC 7476.
11. Implementation of SISO Shift Registers using flip flops(IC 7476).
12. Implementation of SIPO Shift Registers using flip flops(IC 7476).
13. Implementation of PISO Shift Registers using flip flops(IC 7476).
14. Implementation of PIPO Shift Registers using flip flops(IC 7476).
15. Study of Multiplexer by Using 74153

Scheme for Practical Examination

1.	Writing Two programs	:	10 Marks
2.	Execution of two programs	:	30 Marks
3.	Practical record	:	05 Marks
4.	Viva Voce	:	05 Marks
	Total	:	50 Marks

Note

1.	Internal Assessment for each paper(Theory)	:	10 Marks
2.	Practical Examination of 3 hours duration	:	50 Marks
3.	Theory Examination of 3 hours duration	:	90 Marks
	Total	:	150 Marks

2nd Sem BCA

Paper : BCACsT2.5 – Data Structure Using C

4 Hrs/WEEK

Total: 60Hrs.

- ❖ **Chapter 1 : Introduction to Data Structure** **6 Hrs**
Definition, classification of data structures: operations on data structure. Meaning of static and dynamic memory allocation, memory allocation functions: malloc(), calloc(), realloc() and deallocation of memory- free().
- ❖ **Chapter 2: Linked Lists** **10 Hrs**
Definition, components of linked list, representation of linked list, advantages and disadvantages of linked list. Types of linked list: singly linked list, doubly linked list, circular linked list. Operations on singly linked list: creation, insertion, deletion and display.
- ❖ **Chapter 3: Stacks** **12 Hrs**
Definition, array representation of stack, stack operations, array implementation of stacks and linked implementation of stacks. Infix, prefix and postfix notation, conversion of an arithmetic expression from infix to prefix, infix to postfix and application of stacks- recursion, evaluation of postfix expression, parenthesis evaluation, towers of hanoi.
- ❖ **Chapter 4: Queues** **7 Hrs**
Definition, array representation of queue, types of queues: simple queue, circular queue, double ended queue, priority queue. Array implementation of queue and linked implementation of queue.
- ❖ **Chapter 5: Graphs** **5 Hrs**
Introduction to graphs, vertex, edge, simple graph, general graph, self loop, parallel edges, degree of a node, walk, path, cycle, null graph, complete graph. Array representation and linked representation of graph.
- ❖ **Chapter 6: Trees** **10 Hrs**
Definition: Tree, Binary tree, Complete Binary tree, Binary Search Tree. Terminology: degree of node, level, depth, height, root node, internal node, leaf node, siblings, parent node, ancestors of a node, forest. Binary Tree: Array representation of Binary tree, Linked representation of Binary tree, creation of BST, tree traversal techniques: pre-order, in-order and post-order traversal. Introduction to AVL tree.
- ❖ **Chapter 7: Searching & Sorting:** **10 Hrs**
Searching: Definition, Sequential & binary search.
Sorting: Definition, types: Merge sort, Quick sort, Heap sort.

Reference Books:

1. Horowitz, Sahni, Anderson-Freed: Fundamentals of Data Structures in C, 2nd Edition, Universities Press, 2007.
2. Debasis Samanta: Classics Data Structure, 2nd Edition, PHI, 2009

3. Robert Kruse & Bruce Leung: Data Structures & Program Design in C, Pearson Education, 2007.
4. Systematic approach to Data Structures Using C by Padma Reddy, Sri Nandi Publication, Bangalore.
5. Data Structures by Tremblay and Sorrenson

**BCACsP2.6: Data Structures Using C
Practical**

4 Hrs/Week

Max. Marks: 50

1. Write a program to implement nCr using recursion.
2. Write a program to illustrate Towers of Hanoi problem for n disks.
3. Write a recursive program to print Fibonacci series of n number.
4. Write a program to search the given element using sequential search.
5. Write a program to search the given element using binary search.
6. Write a program to sort the given n elements using Max Heap sort.
7. Write a program to sort the given n elements using Merge sort.
8. Write a program to sort the given n elements using Quick sort.
9. Write a program to insert an element into a singly linked list.
10. Write a program to delete an element from a singly linked list.
11. Write a program to implement stacks using arrays.
12. Write a program to implement stacks using linked lists.
13. Write a program to convert infix expression into post fix expression.
14. Write a program to implement ordinary queues using arrays.
15. Write a program to implement queues using linked lists.
16. Write a program to implement circular queue using array .
17. Write a program to construct a binary search tree and perform tree traversal.

Scheme for Practical Examination

1. Writing Two programs	:	10 Marks
2. Execution of two programs	:	30 Marks
3. Practical record	:	05 Marks
4. Viva Voce	:	05 Marks
Total	:	50 Marks

Note

1. Internal Assessment for each paper(Theory)	:	10 Marks
2. Practical Examination of 3 hours duration	:	50 Marks
3. Theory Examination of 3 hours duration	:	90 Marks
Total	:	150 Marks

3rd Sem BCA

Paper: BCACsT3.1 Computational Numerical Techniques

4 Hrs /Week

Total: 60Hrs.

- ❖ **Chapter 1 : Matrix:** **12 Hrs**
Introduction, Recapitulation, Determinants, Adjoint of a Matrix, Inverse of a square Matrix, Solution of system of linear equations by Cramer's rule, Solution of linear system of equations using matrix method, Eigen values and Eigen Vectors, Cayley-Hamilton Theorem.
- ❖ **Chapter 2 : Algebraic Structure:** **8 Hrs**
Introduction, Binary operation (Binary composition), Definition of a Group, Modular Systems, Properties of Groups (without proof), Sub groups.
- ❖ **Chapter 3 : Mathematical logic:** **8 Hrs**
Introduction- propositional calculus –Basic logical operations- Tautologies-Contradiction-Argument-Method of proof- Predicate calculus.
- ❖ **Chapter 4 : Differential Calculus:** **8 Hrs**
Introduction, recapitulation, calculation of the n^{th} derivative of standard functions, Leibniz's theorem(Without Proof).
- ❖ **Chapter 5 : Numerical Analysis. Roots of equations:** **12 Hrs**
Locating roots of $f(x)=0$, Bisection method and convergence analysis, Newton's method and convergence analysis, failure of Newton's method due to bad starting points, modification of Newton's method to find multiple roots, Newton's method for system of non-linear equations, secant method and convergence analysis.
- ❖ **Chapter 6 : Interpolation and numerical differentiation** **8 Hrs**
Polynomial and its existence, Lagrange and Newton form of interpolating polynomial, divided difference and recursive property, inverse interpolation, error in polynomial interpolation, first and second derivative formulae via interpolation polynomial
- ❖ **Chapter 7 : Numerical integration:** **4hrs**
Trapezoidal, Simpson's 1/3 and 1/8 rules and adaptive Simpson rules and Error analysis.

Reference Books:

1. B.S.Grewal, Higher engineering mathematics, 43rd Edition, Khanna Publishers.
2. Jain, Iyengar & Jain, Numerical methods for scientific & engineering computation, New Age International, 2003.

3. A.R.Vasishtha & A.K.Vasishtha, Trigonometry & Algebra, Krishna's series, 2009.
4. Discrete Mathematics Structures with Applications to computer science - J. P Tremblay R Manohar – Mc Graw Hill International Edition.
5. Numerical Mathematics & computing, Cheney & Kincaid, Cengage learning, 2012.

**BCACsP3.2 : Numerical Analysis Lab
Practical**

4 Hrs/Week

Max. Marks : 50

1. Write a program to find the roots of an equation $f(x)=0$ using Bisection method.
2. Write a Program to find the simple/multiple roots of $f(x)=0$ using Newton-Raphson method.
3. Write a program to find the roots of system of non-linear algebraic equations using Newton's method.
4. Write a program to find the roots of $f(x)=0$ using Secant method.
5. Write a program to find the integral of a function using Trapezoidal rule.
6. Write a program to find the integral of a function using Simpson's 1/3rd and 3/8th rule using switch case.
7. Write a program to find the integral of a function using adaptive Simpson method.
8. Write a program to find the value of a function at a point using Lagrange's interpolation.

Scheme for Practical Examination

1.	Writing Two programs	:	10 Marks
2.	Execution of two programs	:	30 Marks
3.	Practical record	:	05 Marks
4.	Viva Voce	:	05 Marks
	Total	:	50 Marks

Note

1.	Internal Assessment for each paper(Theory)	:	10 Marks
2.	Practical Examination of 3 hours duration	:	50 Marks
3.	Theory Examination of 3 hours duration	:	90 Marks
	Total	:	150 Marks

3rd Sem BCA

Paper: BCACs3.3 – Object Oriented Programming Using C++

4 Hrs /Week

Total: 60 Hrs

- ❖ **Chapter 1: Introduction to C++** **4 Hrs**
Procedure oriented, object oriented programming, Difference between POP and OOP, History of C++, Basic concepts of OOPs. Applications of OOPs.
- ❖ **Chapter 2: Features of C++** **10 Hrs**
C++ tokens, C++ operators, Structure of C++ program, Compilation and execution of C++ program, getline(), data types, Scope resolution operator, New and delete operator, Manipulators, C++ comments, Creation of variable in C++, Difference between C and C++. Command Line Arguments. Control Statements: Decision making statements, Looping statements, Jump statements. Arrays: Definition, declaration, initialization, types.
- ❖ **Chapter 3: Functions** **8 Hrs**
Definition, Types of functions, Advantages and disadvantages, Basic concepts of functions, Recursive function, Difference: call by value and call by address, Passing structure variables to function, Passing arrays to function, Default arguments, Function overloading.
- ❖ **Chapter 4: Class and objects** **10 Hrs**
Class, Difference between structure and class, Access specifiers, Object: Creation, accessing member functions, Defining member function, Array of objects, Constructors: Constructor, Types & characteristics of constructors, Destructor, Friend function: friend function & characteristics.
- ❖ **Chapter 5: Operator overloading** **7 Hrs**
Definition, characteristics, Syntax of operator overloading function, rules for operator overloading, overloading unary ++ and binary +, *, == operator, data conversion and type casting with examples. Operators which cannot be overloaded.
- ❖ **Chapter 6: Inheritance** **7 Hrs**
Definition, Concept of inheritance, Access control/Visibility modes of inheritance, Types, Constructor and destructor in derived classes, Nested class, Advantages of inheritance.
- ❖ **Chapter 7: Polymorphism** **5 Hrs**
Definition, Types of polymorphism, Virtual function, Rules for virtual function, pure virtual function, Abstract class. Method Overriding. 'this' keyword.

❖ **Chapter 8 : Templates & Exception Handling** **5 Hrs**

Definition, Template Functions, Template Class, Exception Handling: Exception, types, Mechanism-try, catch, throw.

❖ **Chapter 9 : Streams & Files** **4 Hrs**

Stream, Stream class hierarchy, File, File class Hierarchy, Basic file operations, File opening modes, File pointer: Seekg(), tellg(), seekp(), tellp(), End-of-file.

Reference Books:

1. Lippmann: C++ primer, 3/e Pearson Education
2. Object oriented programming with C++, E. Balagurusamy, Tata McGraw Hill publications.
3. Object-Oriented Programming with C++ by M.T. Somashekara, D.S. Guru, H.S. Nagendraswamy and K.S. Manjunatha, PHI, New Delhi.
4. The C++ Programming language, Stroustrup, Pearson edition, 3rd edition.
5. object-oriented programming using C++, Dr.M.A.Rama, fourth edition, Subhas stores

**Paper BCACsP3.4: C++ USING OOPS Lab
Practical**

4 Hrs/Week

Max.Marks: 50

- 1) Write a program to implement digital clock.
- 2) Write a program to calculate area & circumference of the circle using inline function.
- 3) Write a program to find the factorial of a given number using command line arguments.
- 4) Write a program to prepare a shopping list using array of objects.
- 5) Write a program to find the maximum of two numbers using friend function.
- 6) Write a program to swap two numbers using copy constructor.
- 7) Write a program to find maximum of two numbers for different data types using template function.
- 8) Write a program to write & read the data on file.
- 9) Write a program to perform bank transaction to find the total balance of amount of savings account & current account using friend function.
- 10) Write a program to print the sum of two complex numbers using friend function.
- 11) Write a program to perform addition of two matrices using + operator overloading.

- 12) Write program to perform multiplication of two matrices using * operator overloading.
- 13) Write a program to compare two given strings using == operator with friend function.
- 14) Write a program to concatenate two given strings using + operator with friend function.
- 15) Write a program to create student report using inheritance technique.
- 16) Write a program to implement area of geometrical figures (circle & square) using pure virtual function.

Scheme for Practical Examination

1. Writing two programs	:	10 Marks
2. Execution of two programs	:	30 Marks
3. Practical record	:	05 Marks
4. Viva Voce	:	05 Marks
Total	:	50 Marks

Note

1. Internal Assessment for each paper(Theory)	:	10 Marks
2. Practical Examination of 3 hours duration	:	50 Marks
3. Theory Examination of 3 hours duration	:	90 Marks
Total	:	150 Marks

3rd Sem BCA
Paper: BCACsT3.5 INTERNET PROGRAMMING
Theory

4 Hrs/week

Total Hours: 60 Hrs

❖ **Chapter 1 : Fundamentals of web** **8 Hrs**

Internet, Intranet, WWW, web browsers , web servers, Search engines, DNS, URLs, MIME, HTTP, CGI, Internet Security.

❖ **Chapter 2 : Introduction to HTML** **8 Hrs**

Introduction, History and versions of HTML, Advantages & Disadvantages of HTML , XHTML - Differences between HTML and XHTML. Advantages of XHTML over HTML, Basic structure HTML comments, Standard XHTML document structure, XHTML Doc Types, Syntax and Rules of XHTML,

❖ **Chapter 3 : Elements of HTML documents:** **10 Hrs**

Basic text markup: Paragraphs <p>,Headings <h1>.....<h6>,preserving white space <pre> tag, Line break
,<hr>,Presentation elements:<i>,,<u>,<sub>,<sup>,<s>, <tt>, <big>, <small>, Phrase elements:,,<meta> tag, Character entities. Example Programs

❖ **Chapter 4 : Lists , Images and Hyper Linking in HTML:** **12 Hrs**

Lists: Ordered lists, Unordered lists and Definition lists, adding images using tags & setting an image as background, embedding a multimedia on to a web page: Inserting audio files and video files, <marquee> behavior, Types of Hyper links: Internal Links, Local links, External Links, anchor <a> tag, Links with text and images.

❖ **Chapter 5 : Tables and Forms in HTML:** **12 Hrs**

Creating and managing tables: Defining border, <tr>,<th> and <td> tags, cell spacing and cell padding attributes, Rowspan and colspan attributes, <Caption> tag and its attributes. Managing Forms: Creating interactive forms, Form controls, Menus and buttons, Action controls: submit and reset. Using Frames :< frameset> and <frame>, Nested frames.

❖ **Chapter 6: XML** **10Hrs**

XML :XML basics – Introduction – need for XML – Advantages – Working with an XML Document – Structure of an XML Document – DTD- XML Working with XML Schema - Declaring Attributes – XML namespaces – Reusing Schema Components – Grouping elements and attributes. Introduction – CSS – eXtensible Style Sheet language – Formatting Data based on controls – Displaying data in a Tabular Format.

Reference Books:

1. Robert W.Sebesta: Programming the World Wide Web, 4th Edition, Pearson Education, 2008 (chapters 1 to 9)
2. Web programming: Srikanth S, Skyward Publishers.

BCACsP3.6 - HTML & XML Lab

Practical

4Hrs/Week

Max.Marks: 50

1. Write a HTML code to create simple Web page to display your college information.
2. Write a HTML code to display different levels of headings.
3. Write a HTML code to illustrate all text formatting tags.
4. Write a HTML code to create different types of ordered lists.
5. Write a HTML code to display the glossary of any 5 HTML tags using definition lists.
6. Write a HTML code to insert an image of 'Tim Berners Lee' and display his Bio data.
7. Write a HTML code to embed multimedia on to a web page.
8. Write a HTML code to create text and images as links.
9. Write a HTML code to create your class time table.
10. Write a HTML code to create a form to accept student details.
11. Write a HTML code to display a menu of twelve months.
12. Write a HTML code to create nested frames.
13. Writing XML web Documents which make use of XML Declaration, Element Declaration, Attribute Deceleration.
14. Usage of Internal DTD, External DTD, Entity Declaration.

Scheme for Practical Examination

1.	Writing Two programs	:	10 Marks
2.	Execution of two programs	:	30 Marks
3.	Practical record	:	05 Marks
4.	Viva Voce	:	05 Marks
	Total	:	50 Marks

Note

1.	Internal Assessment for each paper(Theory)	:	10 Marks
2.	Practical Examination of 3 hours duration	:	50 Marks
3.	Theory Examination of 3 hours duration	:	90 Marks
	Total	:	150 Marks

4th Sem BCA

Paper: BCACsT4.1 Computer Networks and Data Communications

4Hrs/Week

Total :60 Hrs

❖ Chapter 1 : DATA COMMUNICATIONS :

8 Hrs

Networks – Components: Data Representation, need of network, services. Network models-peer to peer, client server, distributed. Application of network and criteria, Types of connections: Topologies-mesh, star, bus, ring, Categories of Networks -LAN, WLAN,MAN, WAN .

❖ Chapter 2: Protocols and standards

12 hrs

Protocols and standards – standards Organizations – internet standards – internet administration - The OSI model and the TCP/IP protocol suit : the OSI model – layers in the OSI model – TCP/IP protocol suit – addressing – IP versions

❖ Chapter 3 : Application layer

10Hrs

Domain Name Space (DNS) – SMTP – FTP –TFTP- HTTP- TelNet- Architecture-Remote Login – WWW –Introduction to Socket- Introduction to Security –cryptography. The Future of TCP / IP Adress Classes, IP-IPV6 format.

❖ Chapter 4 : Data link layer , Network layer & Transport Layer 20 Hrs

Error detection and correction –Parity checking,Checksum,CRC, Hamming Codes,Flow-control and error control- Sliding window – HDLC-LAN – Ethernet IEEE 802.3 – IEEE 802.4 – IEEE 802.5 – IEEE 802.11 – FDDI – SONET – Bridges.

Network layer-Internetworks – Packet switching and datagram approach – IP addressing methods – Subnetting – Routing-Routing model , Algorithm– Routing table – Routers.

Transport layer: Duties of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) Transmission Control Protocol (TCP) –Port Numbers– Congestion Control – Quality of Services (QOS)

❖ **Chapter 5 : Modern Wireless Communication Systems**

10 Hrs

Wireless Networks Generation -Wireless Transmission Protocols- Wired Vs Wireless Networks Present Day Mobile Communication-The Cellular Fundamentals-Transmitter and Receiver Techniques

Reference Book

- TCP/IP Protocol Suit by Behrouz A. Forouzan Tata McGraw-Hill Third Edn.
- Mobile computing by Rajkamal, Oxford University Press
- Jochen Schillr - Mobile Communication, Addison Wesley, 2000.
- Behrouz A. Forouzan, –Data communication and Networking|, Tata McGraw Hill, 2004.
- Andrew S. Tanenbaum, –Computer Networks|, 4th Edition, Prentice Hall of India, 2003.
- Douglas E.Comer, “Internetworking with TCP / IP – Principles, Protocols and Architectures, Fourth Edition, Prentice – Hall of India Private Limited, 2002.

**BCACsP4.2 - Static Website Project Lab
Practical**

4 Hrs/Week

Max.Marks: 50

Students are expected to develop a static website project for the above mentioned lab. Students can carry out the project in a group /team consisting of not more than 4 students. The entire project to be submitted by each group/team with some related entity information about static website

Note: minimum 8 web pages including all the basic html tags.

Scheme for Practical Examination

1. Writing Two programs	:	10 Marks
2. Execution of two programs	:	30 Marks
3. Practical record	:	05 Marks
4. Viva Voce	:	05 Marks
Total	:	50 Marks

Note

1. Internal Assessment for each paper(Theory)	:	10 Marks
2. Practical Examination of 3 hours duration	:	50 Marks
3. Theory Examination of 3 hours duration	:	90 Marks
Total	:	150 Marks

4th Sem BCA
Paper : BCCsT4.3 Unix Operating System

4 Hrs /Week

Total: 60 Hrs.

❖ Chapter 1: INTRODUCTION TO UNIX

4 Hrs

Evolution of UNIX - UNIX System Structure - Features of Unix - Operating System Services. Architecture of UNIX system, architecture of kernel, features of Kernel.

❖ Chapter 2: UNIX FILE SYSTEM

10 Hrs

Boot block, super block, I-node block and data blocks, Types of files, types of users, UNIX directory structure, File access methods. File and directory related commands-ls, cat, cal, date, calendar, who, printf, tty, sty, uname, passwd, echo, tput, bc, script, spell and ispell, pwd, the Home directory, absolute pathnames, using absolute pathnames for a command, cd, mkdir, rmdir, Relative pathnames.

❖ Chapter 3 : SPECIAL TOOL UTILITY

10 Hrs

File permission and their modes, path, head, tail, wc, tr, cut, sort, grep, egrep, fgrep, tar.

❖ Chapter 4: PROCESS MANAGEMENT

10 Hrs

The process: shell process, parent and children, process status, system process, multiple jobs in background and foreground, changing process priority with nice, premature termination of process. Communication commands-,write, wall, mesg, kill and finger command.

❖ Chapter 5: TEXT EDITING WITH VI EDITOR:

10 Hrs

Different Modes - Cursor Movement Commands - Edit Commands - Saving and Exiting - Miscellaneous Commands - Alphabetical List of Keys. Communicating with Other Users: who, mail, wall, send, mesg, ftp.

❖ Chapter 6: Shell Programming

16 Hrs

Shell Basics-Types of shells, Shell functionality, Environment. Writing first script-Writing script & executing basic script, Debugging script, Making interactive scripts, variables (default variables), Mathematical expressions. Conditional statements-If-else-elif, Test command, Logical operators-AND, OR, NOT, case -esac. Loops- While, For, Until, Break and continue, Command line arguments-Positional parameters, Set and shift ,IFS. Examples.

Reference Books:

1. UNIX – The Complete Reference– Second Edition.
2. Classic Shell Scripting- Arnold Robbins & Nelson H. F. Beebe
3. Unix Shell Programming (3rd Edition) 3rd Edition by Stephen G. Kochan (Author), Patrick Wood (Author)

4. Classic Shell Scripting: by Arnold Robbins (Author), Nelson H. F. Beebe (Author)

**BCACsP4.4: UNIX Lab
Practical**

4 Hrs/Week

Total Marks: 50

1. Use of Basic UNIX Shell Commands: ((man, who, cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown) commands
2. Write a Shell Program to check whether a given year is leap year or not.
3. Write a shell Script program to check whether the given number is even or odd.
4. Write a shell program to check whether a given string is a palindrome or not.
5. Simple shell script for basic arithmetic operations
6. Write a shell program to count the number of vowels.
7. Write a shell script to print the multiplication table for the given number.
8. Write a shell program to find the factorial of a given number.
9. Write a shell script to count lines, words and characters in its input
10. Write a shell program to print a string in reverse order.
11. Write a shell program to display all the files in the current directory.
12. Write a shell script that computes the gross salary of a employee according to the following rules: i)If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic. ii)If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic The basic salary is entered interactively through the key board.
13. Write a shell script to compute gcd lcm & of two numbers. Use the basic function to find gcd & LCM of N numbers.
14. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
15. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.

1. Writing Two programs	:20 Marks
2. Execution of two programs	:20 Marks
3. Practical record	:05 Marks
4. Viva Voce	:05 Marks
Total	:50 Marks

Note

1. Internal Assessment for each paper(Theory)	:10 Marks
2. Practical Examination of 3 hours duration	:50 Marks
3. Theory Examination of 3 hours duration	:90 Marks
Total	:150 Marks

4th Sem BCA

**Paper : BCACsT4.5: Analysis And Design of Algorithms
Theory**

4 Hrs /Week

Total: 60 Hrs

- ❖ **Chapter 1 : Introduction** **10 Hrs**
Definition of algorithm, characteristic of algorithm, study of an algorithm, analysis of algorithm, space complexity, time complexity, asymptotic notations : Big-Oh, Omega, Theta. Different control structures, writing structured programming, advantages of structured programming.
- ❖ **Chapter 2 : Divide and Conquer** **10 Hrs**
General method, binary search, finding maximum & minimum, merge sort, quick sort. [concepts algorithms and tracing]
- ❖ **Chapter 3 : Greedy Method** **10 Hrs**
General method, knapsack problem, job sequencing with deadline, minimum – cost spanning trees, single–source shortest path.
- ❖ **Chapter 4 : Dynamic Programming** **10 Hrs**
Introduction to graphs, definition types, terms related to graph, general method, multistage graphs, all pair shortest paths, the traveling salesman problem, flow shop scheduling.
- ❖ **Chapter 5 : Basic traversal & search techniques** **10 Hrs**
Search & traversal techniques for trees, search & traversal techniques for graphs.
- ❖ **Chapter 6 : Backtracking** **10 Hrs**
General method, 4-Queens problem, sum of subsets, graph coloring, Hamiltonian cycle.

Reference Books

1. “Programming in Ada” by John Barnes, Cambridge University Press
2. Introduction to Algorithms by Thomas H. Cormen , Charles E. Leiserson , Ronald L. Rivest, Clifford Stein, MIT; 3rd edition
3. Design and analysis of algorithms by R. Panneer Selvam second edition, PHI publication.
4. Introduction to the design and analysis of algorithms second edition, By Anany Lebtin Pearson international edition.

BCACsP4.6 : ADA Lab Using C++

Practical

4 Hrs/Week

Total Marks: 50

1. Write a C++ program to implementation of Binary Search.
2. Write a C++ program to implementation of linear search.
3. Write a C++ program to find GCD & Factorial using recursion technique.
4. Write a C++ program to implementation of Bubble sort.
5. Write a C++ program to implementation of Selection sort.
6. Write a C++ program to implementation of insertion sort.
7. Write a C++ program to implementation of quick sort.
8. Write a C++ program to implementation of shell sort.
9. Write a program to from a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
10. Write a program to find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.
11. Write a program to print all the nodes reachable from a given starting node in a digraph using BFS method.
12. Write a program to check whether a given graph is connected or not using DFS method.
13. Write a program to find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.
14. Write a program to implement Floyd's algorithm for the All-Pairs-Shortest-Paths problem.
15. Write a program to implement N Queen's problem using Back Tracking.

Scheme for Practical Examination

1.	Writing Two programs	:10 Marks
2.	Execution of two programs	:30 Marks
3.	Practical records	:05 Marks
4.	Viva Voce	:05 Marks
	Total	:50 Marks

Note

1. Internal Assessment for each paper(Theory) :10 Marks
 2. Practical Examination of 3 hours duration : 50 Marks
 3. Theory Examination of 3 hours duration : 90 Marks
- Total : 150 Marks**

GUIDELINES FOR FINAL PROJECT WORK

- The aim of the Project work is to acquire practical knowledge on the implementation of the programming concepts studied.
- Project should be carried out in batch with minimum of three and maximum of five students, and it may be a work using the software packages that they have learned or the implementation of Concepts from the papers studied or implementation of any innovative idea.
- The Project work should be compulsorily done in the college only under the supervision of the concerned department staff after taking **project synopsis approval by the BOE Chairman in the beginning of the semester.**
- **The approved synopsis should be included in project report.**

University Exam will be conducted as follows.

- Viva-voce will be conducted at the end of VI semester for 50 marks.
- Both the Examiners (50%+50%) should conduct the Viva-Voce Examination during practical session. Out of 50 marks, 25 for Project Evaluation and 25 for Viva. For awarding a pass, a candidate should have obtained 40% of the Total 100 marks.
- Report should be in A4 size paper & book binding with the following table of contents
 - 1) Certificate
 - 2) BOE approved copy
 - 3) Acknowledgement
 - 4) Synopsis
 - 5) Contents
 - 6) About the project
 - 7) Analysis
 - 8) Design
 - 9) Coding
 - 10) Testing
 - 11) Reports/output
 - 12) Conclusion
 - 13) Bibliography