



SARDAR PATEL UNIVERSITY, BALAGHAT

School of Computer Application

Syllabus under NEP

Course: Bachelor of Computer Applications (BCA)

Semester: I

Branch: Computer Science and Application

w.e.f. Academic Session: 2025-26

Subject: Programming in C (BCAMA101T)

UNIT – I

Program Concept, Characteristics of Programming, Various Stages in Program Development, Algorithms, Flow Charts, Programming Techniques – Top Down, Bottom Up, Modular, Structured, Features, Merits, Demerits and Their Comparative Study. Programming Logic – Simple, Branching, Looping, Recursion, Programming Testing & Debugging.

UNIT – II

Introduction to C Language, C Language Standards, Features of C, Structure of C Program, Introduction to C Compilers, Creating, Compiling and Executing C Programs, IDE, Features of Turbo C Compiler, Keywords, Identifiers, Variables, Constants, scope and Life of Variables, Local and Global Variable, Data Types, Expressions. Operators – Arithmetic, Logical, Relational, Conditional and Bit Wise Operators, Precedence and Associativity of Operators, Type Conversion. Library Functions, Character Input/output – getch(), getchar(), getche(), putchar(), Formatted Input/output – printf() and scanf(), Mathematical & Character Functions.

UNIT – III

Control Structures: Declaration Statement, Conditional Statement – if Statement, if else Statement, Nesting of if... else Statement, else if Ladder, The? Operator, switch Statement, Iteration Statements – for loop, while loop, do-while loop, Jump Statements: break, continue, goto, exit(). Arrays – Concept of Single and Multi-Dimensional Array Declaration and Initialization, Strings: Declaration, Initialization, and String Functions.

UNIT – IV

The Need of C Functions, User Defined and Library Function, Prototype of Functions, Prototype of main() Function, calling of Functions, Function Arguments, Argument Passing : call By Value and Call By Reference, Return Values, Nesting of Function, Recursion, Array as Function Argument, Command Line Arguments, storage Class Specified – Auto, Extern., Static, Register.

UNIT – V

Defining Structure, Declaration of Structure variable, typedef, Accessing Structure Members, Member Access Operator, Nested Structures, Array of Structure, structure Assignment, Structure as Function Argument, Function that Return Structure, Union.

Text Books:

1. Programming in C, E. Balaguruswamy, TMH, Publications.
2. Let us C, Yashwant Kanetkar, BPB PUBLICATIONS

Reference Books:

1. Programming with C, Gottfried Schaums Outlines Series, PHI Publications.
2. Computer Fundamentals, P.K. Shinha.
3. Computer Today, S.K. Basandra, Galgotia Publication.



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Programming in C - Lab

1. WAP to calculate Simple Interest when the values of Principal, Rate and Time are given.
2. WAP to calculate Area of Circle when Radius is input from keyboard.
3. WAP to calculate Temperature in Centigrade when temperature in Fahrenheit is input from keyboard.
4. WAP to read two numbers and interchange value of them using and without using new variable.
5. WAP to determine whether an input Year is Leap Year or not.
6. WAP to display the multiplication table of a number input from keyboard.
7. WAP to display the following pattern upto 'n' terms.

1
1 2
1 2 3
1 2 3 4

8. WAP to read two numbers and find their HCF.
9. WAP to calculate the Factorial of a number input from keyboard using Recursive method.
10. WAP to show how to pass an Array to a user defined function.
11. WAP to display largest element of an Array when the elements of the array are input from keyboard.
12. WAP to determine whether the number is Prime or not using user defined function.
13. WAP to swap two numbers using Call by Value and Call by Address.
14. WAP to reads Name, RollNo, and Percentage of five Students's and display them using Array of Structures.
15. WAP to show to Pass a Structure to a user defined function.
16. WAP to calculate total marks, percentage and grade of a student, Marks obtained in each of the five subjects are to be input by the user. Assign grades according to the following criteria:
Grade A: Percentage ≥ 80
Grade B: Percentage ≥ 70 and < 80
Grade C: Percentage ≥ 60 and < 70
Grade D: Percentage ≥ 40 and < 60
Grade E: Percentage ≥ 40
17. Write a menu – driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
18. WAP to display the first 'n' terms of Fibonacci series.
19. WAP to calculate the addition of two compatible matrices.
20. WAP to calculate the product of two compatible matrices.



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Subject: Database Management System (BCAMI102T)

UNIT – I

Data – Database Application – Evolution of DB & DBMS – Need for data management, Introduction and application of DBMS, File systems versus Database systems, Data Models, DBMS Architecture, Data Independence, Data Modeling using Entity, Relationship Model, Enhanced ER Modeling.

UNIT – II

Introduction to relational database, Structure of Relational Database, Relational model terminology domains, Attributes, Tuples, Relations, and relational DB Schema. Relational algebra: Basic operations selection and projection, Set Theoretic operations Union, Intersection, set difference and division, Join operations: Inner Outer Left outer, Right outer and full outer Join. Relational Database design, Functional Dependency, definition, trivial and nontrivial FD, Normalization 1NF, 2NF, 3NF, Decomposition using FD dependency preservation, BCNF, Multi valued dependency, 4NF, Join dependency and 5NF.

UNIT – III

Database storage and querying – Basic Concepts of Indexing and Hashing Query Processing, Measures of Query cost, Query Processing for Select, Sort Join Operations. Basics of Query Optimization, Transformation of Relational Expression Estimating Statistics of Expression, Choice of Evaluation Plan.

UNIT – IV

Concurrency, Recovery and Security – Concurrency Control: Definition of concurrency, lost update, dirty read and incorrect summary problems due to concurrency Control Techniques: Overview of Locking, 2PL, Timestamp ordering, multi versioning, Validation Recovery concepts, Shadow paging, Log Based Recovery, Elementary concepts of Database security: system failure, Backup and Recovery Techniques authorization and authentication.

UNIT – V

Introduction to Current Trends – Centralized and Client Server Architectures, Distributed Databases, Object Oriented Database, Spatial & Temporal Databases, Data Mining & Warehousing, Data Visualization, Mobile Databases, OODB & XML Databases, Multimedia & Web Databases.

Text Books

1. Abraham Silberschatz, Henry Korth, S. Sudarshan, "Database System Concepts", 7th Edition, McGraw Hill.
2. Rajesh Narang "Database management System" PHI.

Reference Books

1. Ramakrishnan and Gherke, "Database Management System", TMH,
2. R. Elmasri and SB Navathe, "Fundamentals of Database System", Pearson, 5th Ed.
3. Singh S.K., "Database System Concepts, design and application", Pearson Education.
4. Bipin Desai, "An Introduction to database Systems", Galgotia Publications.



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Database Management System Lab:

1. Draw an ER diagram to University Database.
2. Draw an ER diagram to Library management System.
3. Create a Library management Schema/database and search anomalies in it.
4. Assume a video library maintains a database of movies rented out, without any normalization, all information is stored in one table as shown below.

Full Names	Physical Address	Movies rented	Salutation	Category
Janet Jones	First Street Plot No 4	Pirates of the Caribbean, Clash of the Titans	Ms.	Action, Action
Robert Phil	3 rd Street 34	Forgetting Sarah Marshal, Daddy's Little Girls	Mr.	Romance, Romance
Robert Phil	5 th Avenue	Clash of the Titans	Mr.	Action

5. Normalize the following Schema with given constraints.
 Books (accession no, isbn, title, author, publisher)
 Users (userid, name, deptid, deptname)
 Accession no -> isbn
 Isbn -> title
 Isbn -> publisher
 Isbn -> title
 Userid -> name
 Userid -> deptid
 Deptid -> department
6. Compare 3NF and BCNF with appropriate example.
7. Give exercise on DDL and DML.
8. Learn Concept of Form and Report with basic example.
9. Create a database named "school.mdb" and perform the following tasks using MS Access or My SQL.

a. Create a table named "student info" having following table structure.

Field Name	Data Type	Structure
Class	Number	
Section	Text	
Roll No.	Number	
Name	Text	40 Characters Long
Photo	OLE Object	Photos of Student
DOB	Date/Time	Date of Birth of Students

- b. Fill at least 5 records.
- c. Prepare a query to display all records and Name should be in ascending order.
- d. Prepare a query named "senior" to display records including fields name, class, sec, rollno, status, photo and value of "status" field must be senior.
- e. Prepare a form of above query "Senior".
- f. Prepare a report of all the fields of above table.

(Handwritten signatures and initials)



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10. Create a database named "library accdb" and perform the following tasks:

a. Create a table named "Book" having following structure:

Field Name	Data Type
Bookid	Text
BName	Text
WName	Text
PYear	Data/Time
PName	Text
Price	Currency

b. Add at least 5 records.

c. Prepare a query to display only records including book name, writer name and publication name. Save the query as "q...book".

d. Prepare a query to display all records on the basis of price which is more than Rs 500.

e. Prepare a form on the basis of table.

f. Prepare a report on the basis of query named "q.... book".



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Subject: Elementary Mathematics (BCAMD103T)

UNIT – I

Sets and Elements, Power Set, Universal Set, Union and Intersection of Sets, Difference of Sets, Complement of a Set. Ordered Pairs, Cartesian product of Sets. Number of Elements in the Cartesian product of two Finite Sets. Equality of Sets, Transitivity of set Inclusion, Universal Set, Complement of a Set, Subsets Proper and Improper Subsists, Union of Sets, Properties of Union Operation, Intersection of sets, Disjoint sets, Properties of Intersection operation, Relative Complement of a Set, De Morgan's Laws, Distributive Laws of Union and Intersection, Definition of Relation, Pictorial Diagrams, Domain, Co- domain and Range of a Relation.

UNIT – II

Function as a special kind of relation from one set to another, pictorial representation of a function, domain, co-domain & range of a function. Real valued function of the real variable, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum and greatest integer functions with their graphs. Sum, difference, product and quotients of functions. Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions, composite functions, inverse of a function. Binary operations. Fundamental Principle of counting factorial $n!$, Permutations and combinations

UNIT – III

Determinant: Determinant of 3rd order, Cramer's rule Consistency of equations Matrices: Types of matrices, Algebra of matrices, linear homogeneous equations, and linear non-homogeneous equations.

UNIT – IV

Mathematical reasoning: Mathematically acceptable statements. Connecting words/phrases – consolidating the understanding of “if (necessary and sufficient) condition”, “implies”, “and/or”, “implied by”, “and”, “or”, “there exists” and their use through variety of examples related to real life and Mathematics. Definition of Statistics, Raw data, Classification of data, Average, Scatter, range, Relationship between Mean, Median, Mode, Dispersion, Mean Deviation, Standard Deviation, Variance.

UNIT – V

Meaning of Probability, Random Experiment an outcome, Sample Space, Sample Point, Types of Sample Space, Types of Events, and Probability of an Event, Total and Conditional Probability, probability distribution of a random Variable, Repeated independent (Bernoulli) trials and Binomial distribution.

Reference Books

1. www.e-booksdirectory.com/mathematics
2. www.origoeducation.com/go-maths
3. Basics of Mathematics By R.D Sharma.
4. Statistics and Solution By V.K. Kapoor.



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Subject: English (BCAAEC104T)

UNIT - I

Listening: Barriers of Listening skill-Approaches to Listening –How to improve Listening exercises.
Speaking: Paralanguage: Sounds, stress, intonation- Art of conversation – Presentation skills – Public speaking- Expressing Techniques.

UNIT - II

Reading: Kinds of Reading – Causes of reading difficulties – Reading strategies – exercises. Writing: Effective writing – Paragraph, Essay, Reports, Letters, Articles, Notices, Agenda & Minutes.

UNIT - III

Communication: Modes of Communication- Barriers – Interpersonal skills, Negotiation skills Non- Verbal communication – Etiquettes.

UNIT - IV

Group Dynamic skills: Group Discussion – Team building & Team work – Be a manager or leader – Decision making – creativity – Time & Stress management skills.

UNIT - V

Interview skills: Types of Interviews – Preparing for interview – Preparing a CV – Structuring the interview, Mock Interview _ Quick Tips.

Reference Books:

1. Sanghi, Seema, Improve your communication skills. 2nd edition.
2. Bernard, Philip. Interpersonal skills Training: A source book of activities. 2005.
3. Ashley, Roderick. How to enhance your employability. 1998.
4. Dr. Alex, K. Soft sill: know yourself & Know the world. 2010.
5. Cornerstone. Developing soft skills. 4th edition 2005.
6. Jones, Daniel. An outline of English phonetics.
7. Aggarwal, Rohini. Business communication and Organization & Management.
8. Grath. E.H. Basic Managerial skills for all.
9. Maxwell, John C. Developing the leader within you.
10. Sunitha, V. Personality Development & communicative English



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Subject: Fundamentals of Computer (BCASEC105T)

UNIT - I

Brief history of development of computers, Computer system concepts, Computer system characteristics, Basic components of a computer system – Control unit, ALU, Input/Output, semiconductor Memory functions and characteristics, memory – RAM, ROM, EPROM PROM and other types of memory, capabilities and limitations, Generations of computers, Analog & Digital & Hybrid computers, General & Special Purpose computers, types of computers - Micro, Mini, Mainframe and Supercomputers, Characteristics and area of Uses. Personal Computer (PCs – evolution of PCs, configuration of PCs, Pentium and Newer, PCs specifications and main characteristics, Types of PCs-Desktop, Laptop, Notebook, Palmtop, PDA etc.

UNIT - II

Input Devices: Keyboard, Mouse, Trackball, Joystick, Scanners, Digitizing tablet, Digital Camera, MICR, OCR, OMR, Light pen, Barcode & Barcode Reader, Quick Response Code (QR Code), Voice Recognition, Touch Screen.

Output Devices: Monitors – Characteristics and types of monitor, Size, Digital, Analog, Resolution, Refresh Rate, Interlaced / Non-interlaced, Dot Pitch, Video Standard – VGA, SVGA, XGA etc. Printers and its Types of Impact and Non-Impact printer, Dot Matrix, Inkjet, Laser, Plotter, 3D Printers, Sound Card and Speakers.

UNIT - III

Storage Fundamentals – Primary Vs Secondary Data Storage and Retrieval Methods- Sequential, direct And Index Sequential, Various Storage Devices – Magnetic Disks, Hard Disk Drives, Floppy, Disks, Zip Drive, Optical Disks, CD, VCD, CD-R, CD-RW, DVD, DVD-RW, Video Disk, Blue Ray Disc, Flash Drives SD/MMC Memory cards, Solid-state Drive (SSD), Physical Structure of floppy & hard disk, drive naming conventions in PC.

UNIT - IV

Software and its need, Types of Software – System, Software, application software, System Software – Operating system – definition & function, Device Drivers & Utility programs, Introduction & features of DOS, Windows, Programming Languages Machine, Assembly, High Level, 4GL, their Merits and Demerits, Uses of Assemblers, Compilers and Interpreter.

Application Software and its Types – Word Processing, Word Processing, Spreadsheet, Presentation Graphics, data Base management, Desktop Publishing, Communication, Educational, Graphics & Multimedia, Business Accounting, MIS, Gaming and ERP Software etc.

Computer Coding System: ASCII, ISCII and Unicode. Number System of Computers: Binary, Octal, Decimal, Hexadecimal and their conversion.



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UNIT - V

Use of communication and IT, Communication process, Component of communication – sender, receiver, transmission medium & protocol, Communication types-simplex, half duplex, full duplex, communication channels-twisted, coaxial, fiber optic, modern-working and characteristics, types of network-client/server and peer-to-peer networks, types of connections-Dialup, Leased Lines, ISDN, DSL, RF, Broad band uses, advantages & disadvantages, Types of Network-LAN, WAN, MAN, Internet, VPN etc., Topologies of LAN-Ring, Bus, Star, Mesh and Tree topologies structure, uses, advantages & disadvantages, Components of LAN-media, NIC, NOS, Network devices- Bridges, HUB, routers, Repeater, Gateways uses, advantages & disadvantages.

Reference Books

1. Fundamentals of computers, paperback by Reema Thareja, Oxford University Press.
2. Computer Fundamentals – 6th Edition by Pradeep K. Sinha, Priti Sinha, BPB Publication.
3. Computers Today, A. Ravichandran , Khanna Book Publishing.
4. Handbook of computer fundamentals by Nasib Singh Gill, Khanna Publishers.