B.A./B.Sc. (Computer Science) Part II (Semester III)
2024-25, 2025-26 & 2026-27 Sessions
(This Scheme is for Regular students of Affiliated Colleges, Constituent Colleges and Centre for Distance & Online Education)

BCSB2101T: C PROGRAMMING AND DATA STRUCTURES

Total Marks: 70
University Examination: 50
Internal Assessment: 20

Maximum Time: 3 Hrs.
Minimum Pass Marks: 35%
Lectures to be delivered: 45-55 Hrs.

A) Instructions for paper-setter

The question paper will consist of three sections A, B & C. Sections A & B will have four questions from the respective sections of the syllabus and will carry 30% marks each. Section C will have 6-12 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from sections A & B of the question paper and the entire section C .
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Overview of C Language: C Fundamental : Introduction to C, character set, identifiers, keywords, data types, constants, variable, user defined data types, arithmetic, unary, relational, logical, assignment and conditional operators & expression. Basic structure of a C program. Data I/O statement : single character I/O, formatted I/O, string I/O functions.

Control Structure: sequencing, alteration (if-else, switch, break, continue, go to, iteration while, do-while, for) and nested loops.

Functions: Defining and accessing a function, passing arguments to a function, specifying arguments data types, function prototypes, recursion.

Storage Classes- Automatic, External, Static, Register.

Pointers and Structures: Character pointers, pointer to arrays, array of pointers. Structure and Unions : Defining and processing structure, Unions Preprocessor Directives.

SECTION B

Basic Notations and Array (Data Structure): Basic concept and notations, data structures, Types of data structure and data structure operations, mathematical notation and functions, algorithmic complexity, Big 'O' notation and time space trade off. Arrays: Linear array, Representation of Linear array in memory, Traversing Linear array, Insertion and deletion in an array, Multi-dimensional array: Row-Major, Column Major order, space array.

Stacks: Push and Pop in Stack. Representation of stack in memory (Using Arrays)

Queues: Insertion and deletion operations.

Searching Techniques: Linear and binary search

Sorting Techniques: Insertion sort, selection sort, bubble sort, merge sort, quick sort.

Text Books:

1. Byron Gottfried , Programming with C, Second edition, Schaum' s outline series, TMH.
2. Vishal Goyal, Lalit Goyal, Pawan Kumar, A Simplified Approach to Data Structures, Shiroff Publications.
3. Shubhnandan S. Jamwal, Programming in C, Pearson Publications.

Reference Books:

1. Seymour Lipschutz, Theory & Practice of Data Structures, McGraw Hill, 1988.
2. B.W. Kerrighan and D.M.Ritchie, The C programming language, PHI
3. Vikram Gupta and S. S. Bhatia, Programming Fundamentals through C Language, Kalyani Publishers.

BCSB2101P: C PROGRAMMING AND DATA STRUCTURES Lab

Max. Marks : 30 | **Maximum Time: 3 hours**
Min. Pass Marks: 35% | **Practical units to be conducted: 45-55 Hrs**

The laboratory course will comprise of exercise to supplement what is learnt under BCSB2101T: C Programming and Data Structures.

Detailed Syllabus

1. Programs to be implemented in C language such as
   Programs to be implemented in C language such as
   (a) to find the sum of digits of a given number.
   (b) to find the sum of odd numbers and sum of even numbers from the numbers entered through the keyboard.
   (c) to check whether a given number is prime or not.
   (d) Conversion from one number system to another number system.

2. Programs related to array such as:
   (a) to find the maximum and minimum in a given array
   (b) for matrix multiplication, addition, subtraction, etc.

3. Programs related to function, structures, pointers
   (a) all the programs should be written with the help of user defined functions.
   (b) String processing with the help of pointers.
   (c) Simple programs using structures, such as printing the merit list of the students record.
4. Programs related to searching and storing.

   All the techniques to be implemented in C Language which are taught in theory paper BCSB2101T: C Programming and data structure.

The break up of marks for the practical will be as under :

Lab Record	:	05 Marks
Viva Voce	:	10 Marks
Program Development And Execution	:	15 Marks

B.A./B.Sc. (Computer Science) Part II (Semester IV)
2024-25, 2025-26 & 2026-27 Sessions
(This Scheme is for Regular students of Affiliated Colleges, Constituent Colleges and Centre for Distance & Online Education)

BCSB2201T: DATABASE MANAGEMENT SYSTEM

Total Marks: 70
University Examination: 50
Internal Assessment: 20

Maximum Time: 3 Hrs.
Minimum Pass Marks: 35%
Lectures to be delivered: 45-55 Hrs.

A) Instructions for paper-setter

The question paper will consist of three sections A, B & C. Sections A & B will have four questions from the respective sections of the syllabus and will carry 30% marks each. Section C will have 6-12 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from sections A & B of the question paper and the entire section C .
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Traditional file procession system: Characteristics, limitation. Database: Definition, composition,
Database Management System : Definition, Characteristic advantages over traditional file processing system, Implication Database approach, Uses of database, DBA and its responsibilities Database schema, instance.
DBMS architecture, data independence, mapping between different levels.
Database language : DDL, DML, DCL.
Database utilities, Data Models, Keys : Super, candidate, primary, unique, foreign.
Entity relationship model : concepts, mapping cardinalities, entity relationship diagram, weak sets, strong entity sets, aggregation, generalization, converting ER diagram to tables.
Relational Algebra : Basic operations, additional operations.

SECTION B

Database design: Functional dependency, decomposition, problem arising out of bad database design, normalization, multi-valued dependency. Database design process, database protection, database integrity, Database concurrency: Problems arising out of concurrency, methods of handling concurrency. Data recovery, database security: Authentication, authorization, methods of implementing security.
Open source Access: Introduction to open source Access tools such as LibreOffice, SQLite etc., working with database and tables, queries in Access, Applying integrity constraints, Introduction to forms, sorting and filtering controls, Reports and Macro: Creating reports using Macros.

Text Book:

1. C.J. Date, An Introduction to Database Systems, Narosa Publishers.

Reference Books:

1. Siberscharts, Korth and Sudarshan, "Database Concepts", Mcgraw Hill Publication.
2. Ivan Bayross, "Oracle 7 The complete reference", BPB Publications.
3. Jeffrey D. Ulliman, "Principles of Database Systems", 2nd Ed., Galgotia Publications.
4. D. Kroenke, "Database Processing", Galgotia Publications.

BCSB2201P: DATABASE MANAGEMENT SYSTEM Lab

Max. Marks : 30 **Maximum Time: 3 hours**
Min. Pass Marks: 35% **Practical units to be conducted: 45-55Hrs**

The laboratory course will comprise of exercise to supplement what is learn under Paper BCSB2201T: DATABASE MANAGEMENT SYSTEM.

Open Source ACCESS: Introduction to open source Access tools such as Libre Office, SQLite etc., working with databases and tables, queries in Access Applying integrity constraints.

Introduction to forms, sorting and filtering, controls.

Reports and Macro: creating reports, using Macros.

The breakup of marks for the practical will be as under:

Lab Record	:	05 Marks
Viva Voce	:	10 Marks
Program Development And Execution	:	15 Marks