



Karmaveer Bhaurao Patil University,

Satara

Syllabus for

B. Sc. I Computer Science

Under

Faculty of Science and Technology

(As per NEP 2020)

With effect from Academic Year 2026-2027

Syllabi for Bachelor of Science in Computer Science Part I

PREAMBLE:

This syllabus is framed to give sound knowledge with an understanding of Computer Science to undergraduate students in the first year of B.Sc. degree course. It has been designed to meet the specific needs of B.Sc. Computer Science students in accordance with the NEP 2020 guidelines.

It is an integrated degree in the Faculty of Science, plays a crucial role in modern education. The rapid growth of technology makes it essential to revise the existing Computer Science syllabus. This revision is a sincere effort to move toward a knowledge-driven and technology-oriented era.

It aims to equip students with both theoretical understanding and practical skills. Students from the science faculty must become competent in adapting to technological changes. The updated syllabus focuses on developing confidence in handling computers and related tools. It enables students to write and understand programs in various programming languages. Practical exposure to computer systems and peripherals is also emphasized. The curriculum ensures a strong foundation in programming skills and problem-solving abilities. By the end of the year, students will gain confidence and competence in the field of Computer Science.

GENERAL OBJECTIVES OF THE PROGRAMME:

1. To provide students with a strong foundation in computer science principles, programming, algorithms, data structures and software development.
2. To develop analytical, logical and computational thinking skills for solving real-world problems effectively.
3. To equip students with practical knowledge of modern computing technologies, programming languages, databases, networking and emerging technologies.
4. To foster innovation, creativity and research aptitude in the design, development and application of computing solutions.
5. To develop technical proficiency through laboratory work, projects, internships and hands-on learning experiences.
6. To prepare students for higher education, research, entrepreneurship and successful careers in the information technology and software industries.
7. To instill professional ethics, social responsibility, teamwork, effective communication and lifelong learning skills.
8. To encourage the application of computer science knowledge for sustainable development and to address societal and industrial challenges through technology-driven solutions.

GENERAL OUTCOMES OF THE PROGRAMME:

After completing the B.Sc. Computer Science program, graduates will:

1. Demonstrate a strong understanding of computer science concepts, programming principles, algorithms, data structures, and software development methodologies.
2. Apply computational thinking and technical skills to analyze, design, develop and implement efficient computing solutions for real-world problems.
3. Pursue higher education and research in Computer Science, Information Technology, Data Science, Artificial Intelligence, Cyber Security and related disciplines in India and abroad.
4. Qualify for employment opportunities in government organizations, public sector undertakings and competitive examinations requiring a bachelor's degree.
5. Secure entry-level positions in the software, information technology, data analytics, web development, networking, cloud computing and related industries.
6. Demonstrate professional ethics, effective communication, teamwork and leadership skills

required in multidisciplinary and multicultural work environments.

7. Adapt to emerging technologies through lifelong learning, continuous skill enhancement and professional development.

PROGRAM SPECIFIC OBJECTIVES:

1. The students are expected to understand the fundamentals, principles, mathematical, recent IT concepts and recent developments in the Computer Science.
2. The practical course is in relevance to the theory courses to improve the understanding of the concepts.
3. It is expected to inspire and boost interest of the students towards Computer Science as the main subject.
4. To develop the power of appreciations, the achievements in Computer and role in nature and society.
5. To enhance student sense of enthusiasm towards IT and to involve them in an intellectually Stimulating experience of learning in a supportive environment.

PROGRAM SPECIFIC OUTCOMES:

After completion of B.Sc. Computer Science program, student will,

1. Develop comprehensive knowledge and a deep understanding of programming, data structures, databases, and software development concepts.
2. Acquire technical proficiency in programming languages such as Java, Python, C# and various web technologies.
3. Design and develop software applications, including web and mobile-based applications, using appropriate tools and technologies.
4. Apply computational techniques and logical approaches to solve real-world problems efficiently.
5. Understand and utilize emerging technologies such as Artificial Intelligence, Machine Learning and Data Science in practical applications.
6. Analyze, design and implement efficient systems using modern software development tools and methodologies.
7. Effectively communicate technical ideas through proper documentation, presentations and demonstrations.
8. Follow professional ethics and demonstrate responsibility in software development and IT-related practices.

1. TITLE: Computer Science

2. YEAR OF IMPLEMENTATION: From 2026-2027

3.DURATION: 01 year

4. ELIGIBILITY OF STUDENTS: 12th Science /IT/Mathematics

5. PATTERN: Semester

6. MEDIUM OF INSTRUCTION: English

7. Medium of Instruction: The medium of instruction shall be in English.

Batch Size:

B.Sc. I -20 students per batch

B.Sc. II -16 students per batch

B.Sc. III-12 students per batch

B.Sc. IV Honors -20 students per batch

8. Eligibility of the Core Faculty:

- Assistant Professor: Master of Science with specialization in Computer Science and NET/ SET/ Ph.D.
- Associate Professor: Master of Science in Computer Science with NET/ SET/Ph.D.
- Professor: Master of Science in Computer Science with NET/ SET/Ph.D.

Eligibility for Professor of Practice or Professional Trainer:

Any other eligibility as per the Guidelines and Regulations Passed by the Board of Concerned Studies, Academic Council of the College / University and Rules and Regulations of Karmaveer Bhaurao Patil University, Satara, Government of Maharashtra, and UGC norms.

Eligibility for Adjunct Professor of Practice or Professional Trainer:

As per eligibility prescribed by UGC

9. STRUCTURE OF COURSE: (As per NEP 2020)

Sem (Level)	Courses			OE	AEC/ VEC/ IKS	Total credit
	Course I	Course II	Course III			
Sem I (4.5)	DSC I (2) DSC II (2) DSC P I (2)	DSC I (2) DSC II (2) DSC P I (2)	DSC I (2) DSC II (2) DSC P I (2)	OE I (2)	IKS I (2) (Generic)	22
SEM II (4.5)	DSC III (2) DSC IV (2) DSC P II (2)	DSC III (2) DSC IV (2) DSC P II (2)	DSC III (2) DSC IV (2) DSC P II (2)	OE II (2)	VEC I (2) DEGG and IIC	22
Credits	12	12	12	04	04	44

10. TITLE OF THE COURSE:

Semester I				
Sr. No	Components	Course Code	Course Title	Credits
1	Course I	BCST 111	C Programming	2
2		BCST 112	Database Management Systems	2
3	Practical	BCSP 113	Practical based on BCST 111 and BCST 112	2
Total				06
Semester II				
Sr. No	Components	Course Code	Course Title	Credits
1	Course I	BCST 121	C++ Programming	2
2		BCST 122	Relational Database Management Systems	2
3	Practical	BCSP 123	Practical based on BCST 121 and BCST 122	2
Total				06

11. EVALUATION STRUCTURE:

B.Sc. I, Level 4.5, NEP 2.0 Semester I

Course	Course Category	Course Code	Internal Evaluation			ESE	Total Marks	Credits
			CCE – I	CCE - II	CCE - III			
DSC I	T	BCST 111	10	10	10	30	50	02
DSC II	T	BCST 112	10	10	10	30	50	02
DSC P I	P	BCSP 113	20			30	50	02
Total							150	06

B.Sc. I, Level 4.5, NEP 2.0 Semester II

Course	Course Category	Course Code	Internal Evaluation			ESE	Total Marks	Credits
			CCE – I	CCE - II	CCE - III			
DSC III	T	BCST 121	10	10	10	30	50	02
DSC IV	T	BCST 122	10	10	10	30	50	02
DSC P II	P	BCP 123	20			30	50	02
Total							150	06

CCE*-Out of three CCE marks best of two CCE marks consider

INTERNAL EVALUATION STRUCTURE

- Internal evaluation of theory papers shall carry a weightage of 40%.
- Activity: For the internal evaluation of theory papers following activities will be adopted for CCE I & CCE II: class test/ open book test/ online course/ Industrial review/ Industrial visit/ e learning video creation/ assignment/seminar/ case study/ fieldwork/ project.
- CCE III shall consist of multiple-choice questions.
- Each CCE will carry 10 marks for 2-credit theory papers and 20 marks for 4-credit theory papers, and the best two scores will be considered for final score.
- Internal evaluation of practical papers shall carry a weightage of 40%.
- For practical examinations, internal evaluation will be based on student performance, attendance, journal records, and viva voce.

Abbreviations: CCE: Continuous Comprehensive Exam T: Theory, P: Practical, ESE: End Semester Exam

12. OTHER FEATURES:

A) LIBRARY:

Reference books, Textbooks, journals, and Periodicals are available in Institute and Departmental Library. (Separate reference lists are attached along with the respective course syllabus)

B) EQUIPMENT:

1.Computer =120 Computers

Softwares:- Dev C++, Turbo C7, Oracle , JDK, Ubuntu, StarUML, Adobe Photoshop, Visual Studio, Jupyter Notebook, Scala , Tableau, Hadoop

2.LCD projector=2

3.Smart board= 5



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(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science Satara

Board of Studies in Computational Sciences

(Computer Science)

Programme: B.Sc.

Semester –I

Type : DSC-I

Marks: 50

Credits : 2

From: A. Y. 2026-27

Name of the Course and Code: C Programming (BCST 111)

Course Objectives: Students should be able to...

- 1) learn adequate knowledge on the need of programming languages.
- 2) understand the need of problem-solving techniques.
- 3) describe the programming skills using the fundamentals and basics of C Language.
- 4) know algorithms and flowchart of programs in C and to solve the problems.

Course Outcomes: Students will be able to...

- 1) explain algorithm writing and flowchart drawing.
- 2) apply the compilation process and execution of any C Program.
- 3) illustrate the use of functions and arrays to solve in real life applications.
- 4) design arrays to solve in real life applications.

Module	Title and Contents	Hrs.
Module -1:	Computer Fundamentals & Problem Solving 1.1. Fundamentals of algorithms: Notion of algorithm, Notations used for assignment statements and basic control structures. 1.2. Introduction to 'C': General structure of 'C' program, Header file, 'main ()' function. 1.3. Fundamental constructs of 'C': character set, tokens, keywords, Identifiers, Constants - number constants, character constants, string constants, variables. data types in 'C': declaring variables, data type conversion. 1.4. Basic Input and Output functions: input and output statements using printf (), scanf () functions. assignments and expressions: simple assignment statements, arithmetic operators, shift operators, bitwise operators, size of operator.	08
Module -2:	Control Structures and Functions 2.1 Conditional statements: if statement, if-else statements, nested if-else statements, if-else ladder, and switch statement. 2.2 Looping statements, branching statements: use of 'break' and 'continue' statements. 2.3 Concept and need of functions. library functions: Math functions, string handling functions, other miscellaneous functions such as getchar (), putchar (), malloc (), calloc(). 2.4 Writing User defined functions –function definition, functions declaration, function call, scope of variable local variables, global variables.	08

Module -3:	Arrays and structure 3.1 Characteristics of an array, one dimension and two-dimensional arrays, concept of multi-dimensional arrays. 3.2 Array declaration and Initialization. 3.3 Character and string input/output and string related operations. 3.4 Introduction and features of structures, declaration and initialization of structures, array of structures.	07
Module -4:	Pointers & File Handling 4.1 Introduction to pointers: definition, use of pointers, '*' and '&' operators, declaring, initializing, accessing pointers. 4.2 Pointer arithmetic, Pointer to array 4.3 Defining and opening files, file modes: Read, Write, Append closing files 4.4 Input/output operations on files.	07
Reference Books:- 1) S. S. Sridhar, and V. M. Hariharan, 'Problem Solving and Programming in C: A Computational Thinking Approach', Pearson Education, 2025 2) A. N. Kamthane, 'Programming in C', Pearson Education, 2025. 3) C. Dhaya, 'Programming in C', Sri Krishna Hitech Publishing Company Pvt. Ltd., 2023. 4) R. G. Dromey. "How to Solve It by Computer". Pearson, 2022. 5) E. Balagurusamy, 'Programming in ANSI C', McGraw Hill Education, 2019		
Evaluation Pattern: 40:60		
Total Marks: 50		
Internal Continuous Evaluation (20 Marks): • CCE - I: 10 Marks • CCE - II: 10 Marks • CCE - III: 10 Marks (Best of 2 from CCE I, II & III Selected for final Score)		End Semester Examination (50 Marks): • Question -1 – Attempt any five (5 x 2 Marks – 10 Marks) • Question -2 – Solve any two (2 x 10 Marks – 20 Marks) • Question -3 – Solve any four (4 x 5 Marks – 20 Marks) (50 Marks converted to 30 Marks)



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science Satara

Board of Studies in Computational Sciences (Computer Science)

Programme: B.Sc.

Semester –I

Type : DSC-II

Marks: 50

Credits : 2

From: A. Y. 2026-27

Name of the Course and Code: Database Management Systems (BCST 112)

Course Objectives: Students should be able to...

- 1) learn fundamental concepts of data.
- 2) understand principles of databases.
- 3) study the database management operation.
- 4) describe the concept of object-oriented programming languages and Database Management system.

Course Outcomes: Students will be able to...

- 1) apply the basics of data, information, system and Database.
- 2) evaluate basics of different database models for software development.
- 3) design the basics of Relational algebra operations and Relational Calculus.
- 4) demonstrate SQL basics and write queries to perform different operations on real world data.

Module	Title and Contents	Hrs.
Module -1:	Introduction to Database Management System 1.1. Definition of Database. 1.2. Characteristics of database approach. 1.3. Data models, importance of data models, ER Model, relational model, network model, hierarchical model, object oriented model. 1.4. Concept of DBMS, DBMS architecture, Data independence	08
Module -2:	Entity Relationship Modeling and Relational Data Model 2.1 Entities, Attributes and Entity Sets. relation and relationships sets. 2.2 Features of E-R model relational model - basic concepts. 2.3 Types of constraints (relational constraints). 2.4 DFD and its types, ERD and types of relationship.	07
Module -3:	Relational Algebra and Relational Calculus 3.1 Preliminaries, relational algebra operators. 3.2 Operations on relational algebra select, project, union, set different, Cartesian product, rename. 3.3 Operations on relational calculus. 3.4 Tuple relational calculus, domain relational calculus	07
Module -4:	Basics of Structured Query Language 4.1. Basic SQL Queries –DDL (Create, Alter, Drop) commands. 4.2. DML (Insert, Update, Delete) commands, select statement. 4.3. Constraints (Primary Key, Foreign Key, Unique Key, Null, Check, Default, Super Key, Candidate Key).	08

	4.4 Data types, operators, functions	
Reference Books:-		
1) R. Panneerselvam, ‘Database Management Systems’, PHI Learning Private Limited, 2024. 2) P. Radha Krishna and Pranab Kumar Das Gupta, ‘Database Management System Oracle SQL and PL/SQL’, PHI Learning Private Limited, 2024 3) K. Malay, Pakhira, ‘Database Management System’, PHI Learning Private Limited, 2023. 4) S. K. Singh, ‘Database Systems: Concepts, Design and Applications’, Pearson Education, 2023. 5) R. Panneerselvam, ‘Database Management Systems’, PHI Learning Private Limited, 2021.		
Evaluation Pattern: 40:60		
Total Marks: 50		
Internal Continuous Evaluation (20 Marks):		End Semester Examination (50 Marks):
• CCE - I : 10 Marks • CCE - II: 10 Marks • CCE - III: 10 Marks (Best of 2 from CCE I, II & III Selected for final Score)		• Question -1 – Attempt any five (5 x 2 Marks – 10 Marks) • Question -2 – Solve any two (2 x 10 Marks – 20 Marks) • Question -3 – Solve any four (4 x 5 Marks – 20 Marks) (50 Marks converted to 30 Marks)



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science Satara

Board of Studies in Computational Sciences
(Computer Science)

Programme: B.Sc.

Semester –I

Type : DSC P (I)

Marks: 50

Credits : 2

From: A. Y. 2026-27

Name of the Course and Code: Practical based on BCST 111 and BCST 112 (BCSP 113)

Course Objectives: Students should be able to...

- 1) learn basic concepts of C language.
- 2) understand skills for writing complex programs using 'C'.
- 3) study of concept of normalization, Transaction Processing and to learn File Structure and Indexing.
- 4) know the different types of SQL queries performed on data.

Course Outcomes: Students will be able to...

- 1) demonstrate software available for C programming and use the editor for writing Program.
- 2) explain and write algorithms, flowcharts and programs on operators, conditional branching, looping, functions and arrays.
- 3) apply and write queries for any application software and able to handle database.
- 4) design the database commands and management skills

Sr.no	Content	Hrs.
1.	Implement C programs using constants and variables	60
2.	Implement C programs using arithmetic operators to solve given arithmetic operations and Implement C programs using Logical Operators and Bitwise Operators.	
3.	Implement C programs using simple If statement and if. Else statement.	
4.	Implement minimum two C programs using 'while' loop and 'do...while' loop statements.	
5.	Implement C programs using One-Dimensional Array. (e.g.-Write C program to input 5 numbers using array and display sum of it)	
6.	Implement 'Array of Structure' in C (e.g.-accept and display 10 employee information using structure)	
7.	Implement C programs to perform arithmetic operations using pointer.	
8.	File creation and opening in different modes.	
9.	Create table Student, Teacher, Book_dtls, Product and perform all DDL and DML commands	
10.	Create table Employee, Course, College and perform all DML Commands	
11.	Implement 'Array of Structure' in C (e.g.-accept and display 10 employee information using structure)	
12.	Perform calculations on above created tables Condition specification using Boolean and comparison operators (and, or, not, =, <>, >, =, <=)	
13.	Perform the use aggregate functions.	
14.	Create table and apply string handling functions	

15.	Create table Employee with relevant foreign key constraints.	
Reference Books:- 1) Paul Deitel and Harvey Deitel. “C How to Program”. Pearson, 2023. 2) Ashok N. Kamthane. “Programming with ANSI and Turbo C”. Pearson, 2022. 3) R. G. Dromey. “How to Solve It by Computer”. Pearson, 2022. 4) Forta, Ben. MySQL Crash Course. 2nd ed. Indianapolis: Sams Publishing, 2023. 5) Chavan, Hariram, and Sana Shaikh. Introduction to DBMS: Designing and Implementing Databases from Scratch. BPB Publications, 2022.		
Evaluation Pattern:		
Total Marks: 50		
Internal Evaluation (20 Marks): • Journal : 10 Marks • Students' Performance: 05 Marks • Viva: 05 Marks		Practical Exam Paper (30 Marks): • ESE = 30 Marks



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(Computer Science)

Programme: B.Sc.

Semester - II

Type : DSC-III

Marks: 50

Credits : 2

From: A. Y. 2026-27

Name of the Course and Code: C++ Programming (BCST 121)

Course Objectives: Students should be able to...

- 1) understand basic programming concepts such as variables, data types, operators, and control structures using C++.
- 2) study problem-solving skills by writing simple C++ programs.
- 3) learn syntax and structure of C++, including input/output operations.
- 4) describe functions and modular programming to organize code effectively.

Course Outcomes: Students will be able to...

- 1) demonstrate and apply basic C++ syntax and programming constructs.
- 2) apply simple C++ programs using variables, operators, and control statements (if, loops).
- 3) explain functions to solve modular programming problems.
- 4) design arrays and strings to store and manipulate data.

Module	Title and Contents	Hrs.
Module -1:	Fundamentals of C++ Programming 1.1 Introduction to C++: features, history, and applications 1.2 Structure of a C++ program (Header files, main() function, namespaces) 1.3 Tokens in C++: Keywords, Identifiers, Constants, and Variables 1.4 Data types and type modifiers, operators and expressions (Arithmetic, Relational, Logical, Bitwise)	07
Module -2:	Control Structures and Modular Programming 2.1 Decision control statements (if, if-else, nested if, switch) 2.2 Looping constructs (for, while, do-while) 2.3 Jump statements (break, continue, return) 2.4 Functions: definition, declaration, scope, and lifetime of variables, Parameter passing techniques (Call by Value and Call by Reference), recursion	08
Module -3:	Arrays, Strings, and Pointers 3.1 Arrays: One-dimensional, Two-dimensional arrays, and applications 3.2 Strings in C++ (Character arrays and basic string manipulation) 3.3 Introduction to Pointers: declaration, initialization, and dereferencing 3.4 Pointer arithmetic and relationship with arrays dynamic memory allocation (new, delete) and memory management	07
Module -4:	Object-Oriented Programming Concepts 4.1 Introduction to OOP: principles (Encapsulation, Abstraction, Inheritance, Polymorphism) 4.2 Classes and Objects: definition, member functions, access specifiers constructors and destructors (Types and Usage) 4.3 Function overloading and operator overloading 4.4 Basics of inheritance and polymorphism (Virtual Functions – Introduction)	08

Reference Books:-

- 1) E. Balagurusamy, 'Object Oriented Programming With C++', McGraw Hill Education (India), 2026.
- 2) M. Ashwin, V. Sreeprada, and M. Santhosh, 'A Hand Book on C++ Programming', Notion Press, 2022.
- 3) P. Yashavant Kanetkar, 'Let Us C++', BPB Publications, 2020.
- 4) N. Ashok Kamthane, 'Object-Oriented Programming with ANSI and Turbo C++', Pearson Education, 2017.
- 5) K. R. Venugopal and T. Ravishankar, 'Mastering C++', Tata McGraw-Hill Education, 2010.

Evaluation Pattern: 60:40**Total Marks: 50****Internal Continuous Evaluation (20 Marks):**

- CCE - I : 10 Marks
- CCE - II: 10 Marks
- CCE - III: 10 Marks

(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (50 Marks):

- Question -1 – Attempt any five (5 x 2 Marks – 10 Marks)
 - Question -2 – Solve any two (2 x 10 Marks – 20 Marks)
 - Question -3 – Solve any four (4 x 5 Marks – 20 Marks)
- (50 Marks converted to 30 Marks)



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Board of Studies in Computational Sciences (Computer Science)

Programme: B.Sc.

Semester - II

Type : DSC-IV

Marks: 50

Credits : 2

From: A. Y. 2026-27

**Name of the Course and Code: Relational Database Management Systems
(BCST 122)**

Course Objectives: Students should be able to...

- 1) study the concept of normalization.
- 2) learn the transaction processing.
- 3) understand File Structure and Indexing.
- 4) describe the knowledge of RDBMS into real life data and to learn the different types of SQL queries performed on data.

Course Outcomes: Students will be able to...

- 1) explain concepts of database Schema, Normalization and relational mapping.
- 2) evaluate database concepts and file structures and query language.
- 3) write the SQL queries for joining tables, sub query, PL/SQL Programs, Cursor Triggers etc.
- 4) illustrate the concept of Transaction management, deadlocks and concurrency control.

Module	Title and Contents	Hrs.
Module -1:	Database design 1.1. Concept of RDBMS, Database Schema. Data Dictionary. 1.2. ER and EER to relational mapping and Codd's Rules. 1.3. Functional dependencies-properties and types. 1.4. Normalization (Up to BCNF)	07
Module -2:	Structure and Indexing 2.1 Definition of file. Operations on files. 2.2 File of Unordered and ordered records. 2.3 Overview of File organizations. 2.4 Indexing structures for files (Primary index, secondary index, clustering index). Multilevel indexing using B and B+ trees.	08
Module -3:	Structured Query Language 3.1 SQL Clauses (Order By, Group By, Having, Where). 3.2 Concept of Subquery – rules. 3.3 Subquery with (select, insert, update and delete statements), Join (Inner, Outer, Cross). View and types. 3.4 Indexing and types. PLSQL, Cursor and its types. Trigger and its types.	07
Module -4:	Transaction management and Concurrency control 4.1 Transaction management: ACID properties, serializability and concurrency control. 4.2 Lock based concurrency control (2PL, Deadlocks). 4.3 Time stamping methods, optimistic methods, database recovery management 4.4 Recovery manager component – concept of log, recovery algorithms (deferred and immediate, shadow paging) Security.	08

Reference Books:-

- 1) D. Saha, I. Sarkar, S. Mitra, D. Basu, and A. Protiher, 'Database Management Systems: Theory, Design and Real-World Applications', Nats Publication, 2026
- 2) A. Jeffrey, Hoffer, Ramesh Venkataraman, Heikki Topi, and Hillool Bala. Modern Database Management. 14th ed. 2025.
- 3) S. Kumar and A. Tripathi, 'Database Management Systems: e-Book for MCA 2nd Semester of AKTU, UP', Thakur Publication Private Limited, 2025.
- 4) S. Sudarshan, Silberschatz, Abraham, Henry F. Korth, and . Database System Concepts. Reprint ed.2022.
- 5) J. C. Patni, H. K. Sharma, R. Tomar, and A. Katal, 'Database Management System: An Evolutionary Approach', CRC Press, 2021.

Evaluation Pattern:60:40**Total Marks: 50****Internal Continuous Evaluation (20 Marks):**

- CCE - I : 10 Marks
- CCE - II: 10 Marks
- CCE - III: 10 Marks

(Best of 2 from CCE I, II & III Selected for final Score)

End Semester Examination (50 Marks):

- Question -1 – Attempt any five (5 x 2 Marks – 10 Marks)
- Question -2 – Solve any two (2 x 10 Marks – 20 Marks)
- Question -3 – Solve any four (4 x 5 Marks – 20 Marks)
(50 Marks converted to 30 Marks)



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Faculty of Science and Technology

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**Board of Studies in Computational Sciences
(Computer Science)**

Programme: B.Sc.

Semester - II

Type : DSC P (II)

Marks: 50

Credits : 2

From: A. Y. 2026-27

**Name of the Course and Code: Practical based on BCST 121 and BCST 122
(BCSP 123)**

Course Objectives: Students should be able to...

- 1) learn advanced concepts of c language.
- 2) know the skills for writing complex programs using 'C'.
- 3) understand well-structured programs using C language
- 4) study concept of normalization, Transaction Processing and to learn File Structure and Indexing.

Course Outcomes: Students will be able to...

- 1) explain programs on basics of pointer, Structure and Union, File Handling, C Preprocessor.
- 2) discuss student will acquire the program writing skill, technical skill.
- 3) demonstrate the PLSQL programming logic.
- 4) apply practical knowledge of SQL queries.

Sr. No	Content	Hrs.
1.	Study and Implementation of basic structure and tokens in C++	60
2.	Implementation of Arithmetic, Relational, Logical, and Bitwise Operators in C++	
3.	Implementation of Decision Control Statements in C++	
4.	Implementation of Looping and Jump Statements in C++	
5.	Implementation of Functions, Parameter Passing Techniques, and Recursion in C++	
6.	Implementation of Arrays and String Manipulation in C++	
7.	Implementation of Pointers and Dynamic Memory Allocation in C++	
8.	Implementation of Object-Oriented Programming Concepts in C++	
9.	Programs on SQL Clauses, Create a table Employee, Department and apply order by, Group by, where, having clause.	
10.	Programs on Sub query.	
11.	Programs on Join – Create a table student, subject, course and Employee, Product and apply cross, equip/inner, outer (left, right) Join.	
12.	Programs on View, create a table student, Book and create view (Read Only View and Updatable View)	
13.	Programs on Index, create a table student, Book and create all types of Indexes (Simple, Composite, Duplicate, Unique)	
14.	Programs on PLSQL and perform DML operation on table area, calculate even odd number and factorial number.	
15.	Cursor and Trigger Create table Student and create cursor (implicit and explicit) On it. Create trigger on table Employee.	

Reference Books:-

- 1) R. Panneerselvam, 'C++ Programming: A Comprehensive Text', Amazon Self-Publishing, 2024.
- 2) B. W. Kernighan and D. M. Ritchie. The C Programming Language. Delhi: Pearson Education, 2024.
- 3) E. Balagurusamy, Programming in C. New Delhi: McGraw Hill Education, 2023.
- 4) K. N. King, C Programming: A Modern Approach. New York: W. W. Norton & Company, 2021.
- 5) R.Ramakrishnan and J. Gehrke. Database Management Systems. 3rd ed. McGraw-Hill, 2002.

Evaluation Pattern:40:60**Total Marks: 50****Internal Evaluation (20 Marks):**

- Journal : 10 Marks
- Students' Performance: 05 Marks
- Viva: 05 Marks

Practical Exam Paper (30 Marks):

- ESE = 30 Marks