



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Computer Applications

Name of the Program: BSC (Data Science)

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BSCDS101	Major	Programming with C	2	0	2	3	60	20	20	30	20

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:

- To learn the basic logic and programming skills using C.
- To understand and develop modular programming skills.
- To understand the basic idea of Arrays and Pointers.
- To handle the Strings and implement the structures.
- To provide the knowledge of Files and preprocessor directives.

Course Outcomes: Students will be able to

- Describe Logic and programming skills.
- Describe Constructs, loops and arrays
- Describe and write the programs on of function, pointers and operators
- Implement the concepts of Arrays and Strings
- Implement programs of file handling and preprocessor directives.

UNIT- I

Introduction to C Programming: Background of C, Structure of a C program, C Tokens: **5 hrs** Identifiers, Variables, Constants, Keywords, Data Types, Operators; Control Constructs: if-else, for, while, do-while; Case switch statement; Break and Continue; Type conversion & type casting; Formatted & unformatted I/O; Type modifiers & storage classes.

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UNIT- II

Functions: Arguments; Return value; Parameter passing – call by value, call by reference; **8 hrs**
Return statement; Scope, visibility and life-time rules for various types of variable, static variable; Calling a function;

Recursion: Basic Introduction, types of recursion- direct, indirect;

UNIT- III

Arrays: Declaration and Initialization; Arrays as Function Parameters; 2-Dimensional Arrays. **6 hrs**

Introduction to Pointers: Introduction; Declaring Pointer Variables; & and * operators; pointer expressions; Pointer Increments and Scale Factor; Pointer Arithmetic; Pointers and Arrays; Dynamic Memory Management functions like malloc(), calloc(), free();

UNIT- IV

Strings: Introduction to Strings; Standard String Library Functions; Array of String. **6 hrs**

Structures: Introduction; Defining a structure; declaring structure variables; accessing structure members; structure initialization; array of structures.

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UNIT- V

File Management in C: Introduction; Defining and opening a file; closing a file; Input/output and Error Handling on Files.

5 hrs

Preprocessor: basics; #Include; #define; #undef; conditional compilation directive like #if, #else, #elif, #endif, #ifdef and #ifndef.

Text Books:

1. Kanitkar Yashwant, 'Let us C', BPB New Delhi
2. Balaguruswami, 'Ansi C', TMH, Delhi
3. Kerninghan & Ritchie "The C programming language", PHI
4. Schildt "C: The Complete reference" 4th ed TMH.
5. Cooper Mullish "The Spirit of C", Jaico Publishing House, Delhi.

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BSCDS102	Major	Database Management System	2	0	2	3	60	20	20	30	20

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Course Educational Objectives (CEOs):

- To provide a sound introduction to the discipline of database management as a subject in its own right, rather than a compendium of techniques and product specific tools.
- To understand the different issues involved in the design and implementation of a database system.
- To introduce to systematic database design: physical and logical database designs, database modeling, different database models
- To present SQL and procedural interfaces to SQL to query, update and manage a database
- To give an an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.
- To introduce the concepts of transactions and transaction processing.

Course Outcomes (COs):After completion of the course students will be able to

- Understand the database systems concepts
- Design any Desktop application using an entity relationship diagrams (ERD) to express requirements and demonstrates skills to model data requirements and create data models.
- To learn and understand various Database Architectures and Applications.
- apply the knowledge of the subject to any particular database implementation using SQL.
- Apply the normalization concepts to use the database efficiently
- Handle prescribed business problem:
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UNIT-I

Introduction: Data and Information, Data Base, Advantage of DBMS approach, various views of data, data independence, schema and subschema, data models, Database languages, DBA and users, Data Dictionary, Database system architecture.

UNIT-II

ER model: basic concepts, design issues, mapping constraint, keys, ER diagram, weak and strong entity sets, specialization and generalization, aggregation, inheritance, design of ER schema, from ER schema to tables.

UNIT-III

Domains, Relations and Keys: domains, relations, kind of relations, relational database, various types of keys, candidate, primary, alternate and foreign keys.

Relational Algebra and SQL: The structure, relational operations, modifications of database, idea of relational calculus, basic structure of SQL, set operations, aggregate functions, null values, nested sub queries, derived relations, views, join relations, SQL-DDL, DML and DCL.

UNIT-IV

Dependencies and Normal Forms: Basic definitions, dependencies, closure set of dependencies trivial, non trivial, irreducible set of dependencies, introduction to normalization, non loss decomposition, Functional Dependency diagram, Different dependencies and Normal forms up to fifth normal form, dependency preservation.

Database Integrity: General idea. Integrity rules, domain rules, attribute rules, relation rules, Database rules, assertions, triggers, integrity and SQL.

UNIT-V

Transaction, Concurrency and Recovery: Basic concepts, ACID properties, Transaction states, Implementation of atomicity and durability, concurrent executions, basic idea of serializability, concurrency control, deadlock, failure classification, storage structure types, stable storage implementation, data access, recovery and atomicity- log based recovery, deferred Database modification, immediate Database modification, checkpoints.

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Distributed Database: Basic idea, distributed data storage, data replication, data fragmentation horizontal, vertical and mixed fragmentation.

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2. C.J. Date "An introduction to Database Systems" .
3. Elmasri & Navathe, "Fundamentals of Database Systems", III ed. Morgan Kauffman.
4. B.C. Desai. "An Introduction To Database Systems", BPB.
5. Raghurama Krishnan "Database Systems", TMH.

List of Experiments:

1. To study Basic SQL commands (create database, create table, use, drop, insert) and execute the following queries using these commands:
 - Create a database named 'Employee'.
 - Use the database 'Employee' and create a table 'Emp' with attributes 'ename', 'ecity', 'salary', 'enumber', 'eaddress', 'deptname'.
 - Create another table 'Company' with attributes 'cname', 'ccity', 'empnumber' in the database 'Employee'.
2. To study the viewing commands (select, update) and execute the following queries using these commands:
 - Find the names of all employees who live in Delhi.
 - Increase the salary of all employees by Rs. 5,000.
 - Find the company names where the number of employees is greater than 10,000.
 - Change the Company City to Gurgaon where the Company name is 'TCS'.

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3. To study the commands to modify the structure of table (alter, delete) and execute the following queries using these commands:

- Add an attribute named ' Designation' to the table 'Emp'.
- Modify the table 'Emp', Change the datatype of 'salary' attribute to float.
- Drop the attribute 'deptname' from the table 'emp'.
- Delete the entries from the table ' Company' where the number of employees are less than 500.

4. To use (and, or, in , not in, between , not between , like , not like) in compound conditions and execute the following queries using them:

- Find the names of all employees who live in ' Gurgaon' and whose salary is between Rs. 20,000 and Rs. 30,000.
- Find the names of all employees whose names begin with either letter 'A' or 'B'.
- Find the company names where the company city is 'Delhi' and the number of employees is not between 5000 and 10,000.

Find the names of all companies that do not end with letter 'A'.

5. Using aggregate functions execute the following queries:

- Find the sum and average of salaries of all employees in computer science department.
- Find the number of all employees who live in Delhi.
- Find the maximum and the minimum salary in the HR department.

6. To execute the following queries using study the grouping commands (group by, order by)

- List all employee names in descending order.
- Find number of employees in each department where number of employees is greater than 5.

List all the department names where average salary of a department is Rs.10,000.

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9. To write SQL queries to

- Alter table 'Emp' and make 'enumber' as the primary key.
- Alter table 'Company' and add the foreign key constraint.
- Add a check constraint in the table 'Emp' such that salary has the value between 0 and Rs.1,00,000.
- Alter table 'Company' and add unique constraint to column cname.
- Add a default constraint to column ccity of table company with the value 'Delhi'.
- Rename the name of database to 'Employee1'.
- Rename the name of table 'Emp' to 'Emp1'.
- Change the name of the attribute 'ename' to 'empname'.

10. To execute following queries using appropriate SQL statements to

- Retrieve the complete record of an employee and its company from both the table using joins.
- List all the employees working in the company 'TCS'.

11. To study the various set operations and execute the following queries using these commands:

- List the enumber of all employees who live in Delhi and whose company is in Gurgaon or if both conditions are true.
- List the enumber of all employees who live in Delhi but whose company is not in Gurgaon.

12. To study the various scalar functions and string functions (power, square, substring, reverse, upper,

lower, concatenation) and execute the following queries using these commands:

- Reverse the names of all employees.
- Change the names of company cities to uppercase.
- Concatenate name and city of the employee

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13. To study the commands for views and execute the following queries using these commands:

- Create a view having ename and ecity.
- In the above view change the ecity to 'Delhi' where ename is 'John'.
- Create a view having attributes from both the tables.
- Update the above view and increase the salary of all employees of IT department by Rs.1000.

14. To study the commands involving indexes and execute the following queries:

- Create an index with attribute ename on the table employee.
- Create a composite index with attributes cname and ccity on table company.
- Drop all indexes created on table company.

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