



# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## Shri Vaishnav Institute of Computer Applications

### Name of the Program: BSC (Data Science)/ BCA (BDA) - IBM

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*
BCABDA101	Major	Software Foundation 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: 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. **5 hrs**

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### UNIT- II

**Functions:** Arguments; Return value; Parameter passing – call by value, call by reference; **8hrs**  
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. **6hrs**

**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. **6hrs**

**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. KanitkarYashwant, '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.

### List of Experiments:

1. Define an algorithm and flowchart. Draw algorithm and flow chart for a program that converts an input Fahrenheit degree into Celsius equivalent.
2. Write an algorithm and a C program to find the greatest among three numbers.
3. WAP to print an input string in lower case, upper case and mixed case using library function.
4. WAP to read in a three digit number produce following output (assuming that the input is 679)
  - 6 hundreds
  - 7 tens
  - 9 units

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5. WAP a C program to reverse an input number.
6. Draw a flow chart to find prime number from 1 to 100.
7. WAP to find factorial of accepted number.
8. WAP to calculate factorial of a number using recursion.
9. WAP in C to generate Fibonacci series.
10. WAP in C to generate Pascal triangle.
11. WAP in C to swap values of two variables.
12. WAP in C to search a given element in an array using linear search.
13. WAP to sort an integer array in ascending and descending order according to user's choice.
14. Write a menu driven program to perform matrix addition, subtraction and multiplication.
15. WAP a C program to reverse a string by recursion.
16. WAP to read and write a structure.
17. WAP to perform read and write operations from a file.
18. WAP to copy the content of one file into another file.

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BCABDA401N	Major	Fundamentals of Database Management System	2	0	2	3	60	20	20	30	20

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.

**\*Teacher Assessment** shall be based on following components:

Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

### Course Educational Objectives (CEOs):

- To provide students with basic concepts in information system and the benefits of these systems
- To understand the role, requirement and operations that an analyst needed to analyze, design, and implement the systems
- To provide the knowledge of business data modeling for the designing of efficient information systems
- To explain the various issues related with Data Security.

**Course Outcomes (COs):** After completing this course the student 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.
- Apply the knowledge of the subject to any particular database implementation using SQL.
- To learn and understand various Database Architectures and Applications.
- To differentiate between data, information, and knowledge

### UNIT-I

**Introduction:** Introduction to Databases, Purpose of Database System, Database system Vs file system, Database System concepts and architecture, Advantage of DBMS approach, various views of data, data independence, schema and subschema and instances, basic concepts of data models, Database languages, Database administrator and users, data dictionary.

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#### UNIT-II

**ER model:** basic concepts, notation for ER diagram, design issues, Entity types, mapping constraint, Concepts of keys: super, candidate, primary, alternate, foreign, weak and strong entity sets, inheritance.

**Domains and Relations:** domains, relations, kind of relations, relational database.

#### UNIT-III

**Relational Algebra:** The structure, relational operations.

**Relational Calculus:** idea of relational calculus, tuple and domain calculus, Domain relational Calculus, calculus vs algebra.

**Normalization:** Introduction, non-loss decomposition, FD diagram, Normal forms upto fifth normal form, Codd's rules.

#### UNIT-IV

**SQL:** Introduction, basic structure of SQL, Characteristics and Advantage of SQL set operations, aggregate functions, null values, SQL data types and literals. SQL operators, Types of SQL commands. Simple and nested queries, views, join relations. Comparison between tables and views, updatable views, indexes, clustering. Triggers in SQL.

#### UNIT-V

**Transaction, concurrency and Recovery:** basic concepts, ACID properties, Transaction states, Implementation of atomicity and durability, concurrency control, deadlock, storage structure types, stable storage implementation, data access, recovery and atomicity- log based recovery, deferred Database modification.

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#### Text Books:

1. A Silberschatz, H.F Korth, Sudersan, "Database System Concepts", 6th Edition, MGH Publication 2013.
2. C.J. Date, "An introduction to Database Systems", 6th Edition, Pearson 2003.
3. Elmasri&Navathe, "Fundamentals of Database systems", 7<sup>th</sup> Edition, Pearson 2015.
4. B.C. Desai, "An introduction to Database systems", BPB.
5. RaghuRamakrishnan, "Database Management Systems", 3<sup>rd</sup> Edition, TMH 2014.

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

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- Add an attribute named Designation to the table “Emp”.
  - Modify the table Emp, Change the data type 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.
- 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.
  - 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.
  - To execute the following queries using study the grouping commands (group by, orderby)
    - 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.
  - To write SQL queries to
    - Alter table, Emp and make enumber as the primary key.
    - Alter table, Company and add the foreign key constraint.

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- 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 commands for views and execute the following queries using these commands:

- Create a view having ename and ccity.
- In the above view change the ccity 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.

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BSCDSMA101	Minor	Calculus	3	0	0	3	60	20	20	0	0

### Course Objective

*To introduce the students with the fundamentals of the Calculus and its applications and Differential Equations*

### Course Outcomes

*After the successful completion of this course students will be able to:*

- 1. Understand the significance of derivatives.*
- 2. Know about the basic concepts of partial differentiations.*
- 3. Apply the concept of derivatives and partial derivatives to practical problems.*
- 4. Apply the basic concepts of integral calculus.*
- 5. Know the basic concepts of differential equations and find the solution of the differential equations.*

### Course Content:

#### UNIT – I

Derivative and its geometrical and physical interpretation, Sign of derivatives and monotonic increasing and decreasing functions, Rolle's and Mean value theorems and simple applications. Successive differentiation, Leibnitz theorem, Maclaurin's and Taylor's series expansion.

#### UNIT – II

Partial differentiation, Euler's theorem, total derivatives. Functions of two and three variables, Maxima and minima of functions of two variables - Lagrange's Method of undetermined multiplier - Problems only. Implicit function in case of function of two variables (existence assumed) and derivative.

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BSCDSMA101	Minor	Calculus	3	0	0	3	60	20	20	0	0

### UNIT – III

Quadrature, Rectification, Surface, and volume formed by revolution of plane curves.

### UNIT – IV

Formation of differential equations, Variable separable form, Linear Differential equations, Bernoulli's equation, Exact differential equation, Equation reducible to exact differential equation.

### UNIT – V

Differential equation of first order and higher degree, Solvable for  $x, y, p$ . Clairaut's equation and singular solution, Linear differential equations with constant coefficients.

### Reference Books:

1. Principles of Mathematical Analysis: W. Rudin, McGraw-Hill, New York, 1976
2. Differential Calculus: Gorakh Prasad, Pothishala Pvt. Ltd. Allahabad.
3. Differential Calculus: Shantinayakan.
4. An elementary treatise on the Differential Calculus: J. Edwards, Radha Publishing House.
5. Advanced Calculus – David V. Widder (Prentice Hall)
6. Differential & Integral Calculus (Vols. I & II) – Courant & John.
7. Mathematics Analysis: T.M. Apostol, Eddison Wesley Publishing Co.
8. Calculus, Vol. I-II, T.M. Apostol, Wiley.
9. Differential Equations – S. L. Ross (John Wiley).
10. An Elementary Course in Partial Differential Equation – T. Amarnath (Narosa).
11. Higher Engineering Mathematics: B.S. Grewal, Khanna Publisher.

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BSCDSMA102	Minor	Statistical Methods for Data Analysis	3	0	0	3	60	20	20	0	0

### Course Objective

*To introduce the students with the fundamentals of the Statistical Methods.*

### Course Outcomes

*After the successful completion of this course students will be able to:*

- 1. Know various methods of data collection.*
- 2. Create and interpret frequency tables.*
- 3. Apply data graphically and its interpretation.*
- 4. Memorize, understand and calculate the measures of central tendency, dispersion, skewness and kurtosis.*
- 5. Understand the basic ideas of correlation and regression.*
- 6. Create and interpret the line of best fit.*

### Course Content:

#### UNIT – I

Statistical Methods: Definition and scope of Statistics, concepts of statistical population and sample. Data: quantitative and qualitative, attributes, variables, scales of measurement nominal, ordinal, interval and ratio.

#### UNIT– II

Presentation: tabular and graphical, including histogram and ogives, consistency and independence of data with special reference to attributes.

#### UNIT – III

Measures of Central Tendency: mathematical and positional. Measures of Dispersion: range, quartile deviation, mean deviation, standard deviation, coefficient of variation, Moments, absolute moments, factorial moments, Skewness and Kurtosis, Sheppard's corrections.

#### UNIT – IV

Bivariate data: Definition, scatter diagram, simple, partial and multiple correlation (3 variables only), rank correlation. Simple linear regression, principle of least squares and fitting of polynomials and exponential curves.

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BSCDSMA102	Minor	Statistical Methods for Data Analysis	3	0	0	3	60	20	20	0	0

### UNIT – V

Attributes- Notion and terminology, contingency table, class frequencies, and ultimate class frequencies, consistency. Association of attributes, Independence, Measure of association for 2x2 table. Chi-square, Karl Pearson's and Tschuprow's coefficient of association. Contingency tables with ordered categories.

### SUGGESTED READING:

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8<sup>th</sup>Edn. The World Press, Kolkata
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7<sup>th</sup>Edn.), Pearson Education, Asia.
3. Mood, A.M. Graybill, F. A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3<sup>rd</sup>Edn., (Reprint), Tata McGraw-Hill Pub. Co. Ltd.
4. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, S Chand & Co.
5. E.N. Nadar, Statistics, PHI Learning.
6. P. Mukhopadhyaya, Mathematical Statistics, New Central Book Agency, Calcutta.
7. Jim Frost, Introduction to Statistics: An Intuitive Guide for Analyzing Data and Unlocking Discoveries, Jim Frost MS.

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### Semester I & II (Batch 2022-26)

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Two Term Assessment*				
ENG101	AEC	Foundation English	60	20	20	-	-	4	0	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit.

\*Teacher Assessment shall be based following components: Quiz/Assignment/ Projects/Participation in Class, given that no component shall exceed more than 10 marks.

### Course Educational Objectives (CEOs): The students will

- CEO 1 Understand the different nuances of communication.
- CEO2 understand the features of listening and reading skills.
- CEO3 Comprehend the factors that influence use of grammar and vocabulary in speech and writing
- CEO4 study the essential aspects of effective written communication through Business letters and email writing for professional success.
- CEO5 Develop competency in professional communication.

### Course Outcomes (COs): The students will be able to

- CO1 develop a comprehensive understanding of the theoretical and practical aspects of communication.
- CO2 understand and the different aspects of listening and reading.
- CO3 Apply grammatical rules in speech and writing.
- CO4 Use proper formats of written business communication.
- CO5 Demonstrate different strategies for using professional communication skills.

ENG101

Foundation English

### COURSE CONTENTS

#### UNIT I

#### Communication

Communication: Nature, Meaning, Definition, Process, Functions and importance, Characteristics of Communication, Verbal and Non-Verbal Communication, Barriers to Communication.

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# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATE- GORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Terms Exam	Teachers Assessment <sup>a</sup>	END SEM University Exam	Teachers Assessment <sup>a</sup>				
ENG101	AEC	Foundation English	60	20	20	-	-	4	0	0	4

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.

### UNIT II

#### Listening and Reading Skills

Listening: Process, Types, Difference between Hearing and Listening, Benefits of Effective Listening, Barriers to Effective Listening, Overcoming Listening Barriers, and How to Become an Effective Listener, Developing Reading Skills: Reading Comprehension, Process, Active & Passive reading, Reading speed Strategies, Benefits of effective reading, SQ3R Reading technique.

### UNIT III

#### Basic Grammar

Basic Language Skills: Grammar and usage- Parts of Speech, Tenses, Subject and Verb Agreement, Prepositions, Articles, Types of Sentences, Direct - Indirect, Active - Passive voice, Phrases & Clauses.

### UNIT IV

#### Business Letters

Business Correspondence: Business Letters, Parts & Layouts of Business Letter, Job application and Resume, Application Calling/ Sending Quotations/ Orders/ Complaints. E-mail writing, Email etiquettes

### UNIT V

#### Professional Skills

Negotiation Skills, Telephonic Skills, Interview Skills: Team building Skills and Time management

#### Suggested Readings:

- Adair John (2003). **Effective Communication**. London: Pan Macmillan Ltd.
- Thomson A.J. and Martinet A.V. (1991). **A Practical English Grammar** (4<sup>th</sup> ed). New York: Oxford IBH Pub
- Rizvi Ashraf (2005). **Effective Technical Communication**. New Delhi: Tata Mc Graw Hill
- Kratz Robinson (1995). **Effective Listening Skills**. Toronto: ON: Irwin Professional Publishing.

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