Department – Computer Science

Aishwarya College (Autonomous)

Affiliated to Jai Narain Vyas University, Jodhpur

NAAC "A" Grade, Recognised by UGC u/s 2(f) & 12 (B)

M.Sc. (Computer Science)

COURSE SCHEME
&
SYLLABUS

AISHWARYA COLLEGE OF EDUCATION (AUTONOMOUS)

Department of Computer Science - Course Name and Credit Scheme

Master of Science (Computer Science) I Semester

NCrF Level	Theory										
	S.No	Category	Course		Teaching Hours Per Week & Credit				Marks Distribution		
			Code	Title	Lecture	Tutorial	Lab	Credits	IA	ETE	Total
7.0	1	DCC	PGCCC27001T	Programming in C	3	0	0	4	30	70	100
	2	DCC	DMSCC27001T	Database Management Systems (DBMS)	3	0	0	4	30	70	100
	3	DCC	IWTCC27001T	Introduction to Web Technology	3	0	0	4	30	70	100
	4	SEC	MFCSC27001T	Mathematical Foundations Of Computer Science	6	0	0	6	30	70	100
	5	AECC	ENGAC27001T	English	3	0	0	3	30	70	100
	Sub Total				**18**	**0**	**0**	**21**	**150**	**350**	**500**
	Practical										
	6	DCC	CPGCC27001P	C Programming Lab	0	0	2	1	60	40	100
	7	DCC	DMSCC27001P	Database Management Systems Lab	0	0	2	1	60	40	100
	8	DCC	WTLCC27001P	Web Technology Lab	0	0	2	1	60	40	100
	Sub Total				**0**	**0**	**6**	**3**	**180**	**120**	**300**
	Semester Total				**18**	**0**	**6**	**24**	**330**	**470**	**800**

M.Sc. (CS) Semester: I (2025-26)

Discipline Centric Core Course (DCC)

PGCCC27001T: Programming in C

(20 CIA + 80 EoSE. = Max. Marks: 100)

Course Credits	No. of Teaching Hours Per Week	Total No. of Teaching Hours
4 Credits	6 Hours	60 Hours

Course Outcome: On successful completion of the course, the students will be able to:

- Understand and apply the basic syntax and structure of C programming.
- Analyze and solve computational problems using appropriate algorithms and logic.
- Write modular and reusable code using functions and recursion.
- Implement and manipulate arrays, strings, and structures effectively.
- Use pointers for efficient memory access and dynamic allocation.

SYLLABUS

Unit-I: Program Concept, Characteristics of Programming, Various stages in Program Development, Algorithm and Flowchart, Programming Techniques – Top down, Bottom up, Modular, Structured, Cohesion & Coupling. Introduction & features of C, Structure of C program, Variable, Tokens: keywords, identifiers, constants, and operators. Data Types: built-in, derived and user defined. Type conversion: Implicit and Explicit.

Unit-II: Operator's classification: based on availability of operands (unary, binary and ternary) and based on specific category: Arithmetic, Assignment, Relational, Logical, Bitwise, increment/ decrement, conditional. Basic input/output and library functions: Single character (Unformatted) input/output i.e. getch(), getchar(). getche(), putchar(),Formatted input output i.e. printf() and scanf(), Library functions - concepts, Mathematical functions: pow(), sqrt(), sin(), tan(), cos().

Unit-III: Control structures / statements: Conditional statements: independent if, if..else, if..elseif ladder, nested if, switch.. case, Looping: entry controlled and exit controlled and Jump Statements: goto, break, continue, return, exit(). Array: Single and Multi-Dimensional arrays, Array declaration and initialization of arrays, Strings: declaration, initialization, built-in functions: strupr(), strlwr(), strlen(), strrev(), strcat(), strcpy(), strcmp(). Pointers: Declaration, initialization, pointer arithmetic, pointer to pointer, types: generic (void) pointer, NULL pointer.

Unit-IV: Functions: needs, types: User defined: function prototyping, function definition, function calling and library function, categories of function, passing arguments: call by value and call by reference, Recursive function, Array as function argument, Scope and life of variables - local and global variable, Storage class specifier - auto, extern, static, register.

Unit-V: Structure: Defining structure, Declaration of structure variable, Accessing structure members, Union. File Handling Basics: Working with text files

SUGGESTED BOOKS

1. "Programming in ANSI C" – E. Balagurusamy
2. "Let Us C" – Yashavant Kanetkar
3. "The C Programming Language" – Brian W. Kernighan & Dennis M. Ritchie
4. "Programming with C" – Byron Gottfried (Schaum's Outlines)
5. "Computer Fundamentals and Programming in C" – Reema Thareja

M.Sc. (CS) Semester: I (2025-26)

Discipline Centric Core Course (DCC)

DMSCC27001T: Database Management Systems (DBMS)

(20 CIA + 80 EoSE. = Max. Marks: 100)

Course Credits	No. of Teaching Hours Per Week	Total No. of Teaching Hours
4 Credits	6 Hours	60 Hours

Course Outcome: On successful completion of the course, the students will be able to:

- Recall the Database Management Systems (DBMS) and the challenges of file-based data management systems and the responsibilities of a database administrator (DBA) and a database manager in database management.
- Explain the concepts of entities, attributes, and relationships in ERM and their roles in database design
- Apply the concepts of database languages, data independence principles to design and create database schemas
- Apply various join operations, mathematical functions and string oriented functions
- Explain PL/SQL block, data type, control structures, sequential control, transaction management

SYLLABUS

Unit-I: Introduction to Database: Need for DBMS, advantages of DBMS, views of data, instances and schema data independence, database administrator, database manager, database languages, overall structure of DBMS.

Unit-II: Entity Relationship Model: Entities, attributes, relationships, constraints, keys, E-R diagram. Concept of strong and weak entity sets, generalization, specialization and aggregation. RDBMS – Basic concept, Codd's rule for RDBMS. Functional dependencies and Normalization for relational databases - design guidelines for relational schema, functional dependencies, normal forms (1NF, 2NF and 3NF).

Unit-III: SQL – Basic structure – Clauses, data types, creates tables. Modification of the database – deletion, insertion, updates. Retrieving data from tables, ordering, set operations – union, intersect, except, concept of NULL values, nested subqueries – set membership, set comparison, exist and not exist operator, unique, not unique construct.

Unit-IV: Joins, equi-joins, non-equi-joins, self joins, outer joins. Aggregate functions – group by and having clause. Math functions-ABS, CEIL, FLOOR, ROUND, POWER, SQRT, EXP, MOD AND TRUNC, string functions-LENGTH, LOWER, UPPER, TRIM, CONCAT. Views, granting and revoking permissions.

Unit-V: PL/SQL: Basics concepts, advantages, variables, constants, data types, comments, output function, control structures – conditional, iterative and sequential control, database access with PL/SQL, transaction management Cursor – basic concept, types-implicit and explicit, Procedures and Functions - advantages, creation, execution, deletion, overloading, stored procedures and functions. Packages – creation and execution. Triggers - use, types, creating, deleting. Exception Handling.

SUGGESTED BOOKS

1. Ivan Bayross, Title: SQL, PL/SQL – The Programming Language of Oracle,BPB Publications
2. Silberschatz, Korth & Sudarshan, Database System Concepts, McGraw Hill Education
3. Dr. Madhulika Jain, Satish Jain, DBMS: Complete Practical Approach, BPB Publications

M.Sc. (CS) Semester: I (2025-26)

Discipline Centric Core Course (DCC)

IWTCC27001T: Introduction to Web Technology

(20 CIA + 80 EoSE. = Max. Marks: 100)

Course Credits	No. of Teaching Hours Per Week	Total No. of Teaching Hours
4 Credits	6 Hours	60 Hours

Course Outcome: On successful completion of the course, the students will be able to:

- Understand how the Internet and web technologies work.
- Design and build static web pages using HTML5 and CSS.
- Add interactivity to web pages using JavaScript.
- Implement dynamic web pages using PHP.
- Integrate web applications with a backend database and deploy websites.

SYLLABUS

Unit-I: Introduction to Web and HTML: Introduction to Internet, Web, and HTTP/HTTPS, Web Browsers and Servers, URL, DNS, Domain Names, Hosting, Structure of HTML Document (HTML5), HTML Elements: Headings, Paragraphs, Links, Lists, Images, Tables, Forms and Input Controls, HTML5 Semantic Tags

Unit-II: Cascading Style Sheets (CSS): Introduction to CSS: Syntax, Types (Inline, Internal, External), Selectors and Properties, CSS for Text, Color, Backgrounds, Borders, Box Model: Margin, Padding, Border, Layout Design: Flexbox, Grid, Responsive Web Design with Media Queries

Unit-III: JavaScript and Client-side Scripting: Introduction to JavaScript: Syntax, Variables, Data Types, Control Structures: Conditional Statements, Loops, Functions and Arrays, Event Handling and Form Validation, DOM (Document Object Model) Manipulation, JavaScript and HTML Integration

Unit-IV: Server-side Programming with PHP: Introduction to PHP: Syntax, Variables, Operators, Control Structures, Functions, Arrays, Form Data Handling using GET and POST, Session Management and Cookies, File Handling and PHP Functions

Unit-V: MySQL and Web Deployment: Introduction to MySQL: Databases, Tables, Data Types, Basic SQL Commands: SELECT, INSERT, UPDATE, DELETE, Connecting PHP to MySQL, Database-driven Web Application Basics, Web Hosting Concepts: FTP, Domain Name System, Introduction to SEO and Web Analytics

SUGGESTED BOOKS

1. Achyut Godbole, Atul Kahate – Web Technologies: TCP/IP to Internet Application Architectures, McGraw Hill Education
2. Ivan Bayross – Web Enabled Commercial Application Development using HTML, DHTML, JavaScript, Perl CGI, BPB Publications
3. Robin Nixon – Learning PHP, MySQL & JavaScript with jQuery, CSS & HTML5, O'Reilly
4. Jon Duckett – HTML and CSS: Design and Build Websites, Wiley
5. Thomas Powell – JavaScript: The Complete Reference, McGraw Hill
6. Kogent Learning Solutions Inc. – Web Technologies: HTML, JavaScript, PHP, Java, JSP, ASP.NET, Dreamtech Press

M.Sc. (CS) Semester: I (2025-26)

Discipline Centric Core Course (DCC)

MFCSC27001T: Mathematical Foundations Of Computer Science

(20 CIA + 80 EoSE. = Max. Marks: 100)

Course Credits	No. of Teaching Hours Per Week	Total No. of Teaching Hours
4 Credits	6 Hours	60 Hours

Course Outcome: On successful completion of the course, the students will be able to:

- Practical scenarios and determine cardinality and relationships between sets.
- Analyse domain, range, and properties of relations and functions in computational and mathematical contexts.
- Analyse domain, range, and properties of relations and functions in computational and mathematical contexts.
- Apply matrix operations and determinants to solve mathematical and geometric problems.
- Summarize and analyze data using statistical techniques and graphical tools.

SYLLABUS

Unit-I: SETS: Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, Simple Applications.

Unit-II: RELATIONS AND FUNCTIONS: Properties of Relations, Equivalence Relation, Partial Order Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions.

Unit-III: PARTIAL ORDER RELATIONS AND LATTICES: Partial Order Sets, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal Point, Glb, lub, Lattices & Algebric Systems, Principle of Duality, Basic Properties, Sublattices, Distributed & Complemented Lattices.

Unit-IV: MATRICES AND DETERMINANT: Definition and Types of Matrices, Addition, Subtraction and Multiplication of Matrices, Non-commutatively of multiplication of matrices, Scalar Multiplication, Transpose of a Matrix.

Determinant: Determinant of a square matrix (up to 3x3 matrices), properties of determinants, minors, cofactors, expansion of determinants, application of determinants in finding the area of a triangle. Adjoint and Inverse of a matrix.

Unit-V: Statistics: Data collection methods, Data classification, Frequency Distribution. Graphical representation of frequency distribution. Measures of Central Tendency - Mean, Median, Mode. Measures of Dispersion - Mean Deviations, Standard Deviations, Variance and Skewness.

SUGGESTED BOOKS

1. C. L. Liu – Elements of Discrete Mathematics, TMH
2. R. D. Sharma - Basic Mathematics
3. S. P. Gupta – Statistical Methods, Sultan Chand & Sons
4. U. Rizwan, Mathematical Foundation - SciTech, Chennai

M.Sc. (CS) Semester: I (2025-26)

Ability Enhancement Core Course (AECC)

ENGAC27001T: English

(20 CIA + 80 EoSE. = Max. Marks: 100)

Course Credits	No. of Teaching Hours Per Week	Total No. of Teaching Hours
4 Credits	6 Hours	60 Hours

Course Outcome: On successful completion of the course, the students will be able to:

- Students will gain a comprehensive understanding of basic sounds of English and identify key literary forms.
- Students will Interpret and appreciate selected poetic and literary texts by Shakespeare, Tagore, and R.K. Narayan, demonstrating a grasp of theme, tone, and literary techniques.
- Students will apply knowledge of English grammar structures such as form classes, articles, prepositions, modal auxiliaries, and the use of prefixes, suffixes, and connectives in context..
- Students will explore the concept of Using appropriate tenses, voice (active/passive), and speech (direct/indirect) so as to learn English effectively.
- Students will compose formal and informal letters, reports, and job applications with clarity, correct structure, and suitable vocabulary.

SYLLABUS

Unit-I: The Sounds of English: Consonants, Mono-thongs, Diphthongs. An Acquaintance with Literary Forms:- Elegy, Ballad, and Sonnet An Acquaintance with Figures of Speech:- Simile, Metaphor, Personification, and Irony

Unit-II: Poetry : William Shakespeare – All the World is a stage. Rabindranath Tagore – Where the Mind is without Fear. Act Play/Novel: R. K. Narayan – Vendor of Sweets.

Unit-III: Introduction to Form Classes, Tenses and its uses. Articles, Preposition and Modal auxiliaries.

Unit-IV: Active and Passive Voice, Direct and Indirect Speech, Prefixes and Suffixes, Connectives.

Unit-V: English Writing Skills: Formal Letters & Informal Letters, Report Writing, Application for Job / Job Letter.

SUGGESTED BOOKS

1. "An Introduction to Literary Forms" by W.H. Hudson.
2. "The Vendor of Sweets" by R.K. Narayan
3. "English Verse: An Introduction" by David Kennedy
4. "High School English Grammar and Composition" by P.C. Wren & H. Martin.
5. "Effective English Communication" by M.A. Yadugiri & Geetha Rajeevan.

M.Sc. (CS) Semester: I (2025-26)

Discipline Centric Core Course (DCC)

CPGCC27001P: C Programming Lab

(60 CIA + 40 EoSE. = Max. Marks: 100)

Course Credits	No. of Teaching Hours Per Week	Total No. of Teaching Hours
2 Credits	4 Hours	60 Hours

SUGGESTED LABORATORY EXCERCISE

1. Write a program to swap two numbers using a temporary variable.
2. Write a program to find the sum and average of three numbers.
3. Write a program to check whether a number is even or odd using.
4. Write a program to find the largest among three numbers.
5. Write a program to display a simple calculator using switch-case.
6. Write a program to print the multiplication table of a number using loops.
7. Write a program to generate the Fibonacci series up to n terms.
8. Write a program to find the sum and average of elements in a 1D array.
9. Write a program to sort an array in ascending order.
10. Write a program to perform matrix addition and multiplication.
11. Write a program to count the number of vowels in a string.
12. Write a program to find the factorial of a number using recursion.
13. Write a program to demonstrate call by value and call by reference.
14. Write a program to create a structure for student data and display it.
15. Write a mini-project to manage employee records using structures and file handling.

SUGGESTED BOOKS

1. "Programming in ANSI C" – E. Balagurusamy
2. "Let Us C" – Yashavant Kanetkar
3. "The C Programming Language" – Brian W. Kernighan & Dennis M. Ritchie
4. "Programming with C" – Byron Gottfried (Schaum's Outlines)
5. "Computer Fundamentals and Programming in C" – Reema Thareja

M.Sc. (CS) Semester: I (2025-26)

Discipline Centric Core Course (DCC)

DMSCC27001P: Database Management Systems Lab

(60 CIA + 40 EoSE. = Max. Marks: 100)

Course Credits	No. of Teaching Hours Per Week	Total No. of Teaching Hours
2 Credits	4 Hours	60 Hours

SUGGESTED LABORATORY EXCERCISE

Q1. Create a database named UniversityDB.

Q2. Create the following tables with appropriate data types and constraints:

- Students(StudentID, Name, Gender, DOB, DepartmentID)
- Departments(DepartmentID, DeptName)
- Courses(CourseID, CourseName, Credits)
- Enrollments(EnrollID, StudentID, CourseID, Semester)

Q3. Alter the Students table to add a new column Email with NOT NULL constraint.

Q4. Add a CHECK constraint to ensure that the Credits in Courses table is between 1 and 6.

Q5. Add a FOREIGN KEY to Enrollments table referencing Students.

Q6. Insert at least 5 sample records into each of the above tables.

Q7. Update the Email of a student whose name is 'Amit'.

Q8. Delete all students who belong to a department that no longer exists.

Q9. Display all student names in ascending order.

Q10. List all students born after the year 2000.

Q11. Retrieve the list of departments that start with the letter 'C'.

Q12. Count the total number of students enrolled in the 'Computer Science' department.

Q13. Find the average number of credits for all courses.

Q14. List departments having more than 3 students.

Q15. Write a query to list all students with their course names using INNER JOIN.

Q16. Display all students and the courses they are enrolled in, including those not enrolled in any course (LEFT JOIN).

Q17. Find the courses that are not taken by any student.

Q18. Find the names of students who have enrolled in all courses having more than 3 credits.

Q19. Retrieve students who belong to the same department as 'Priya'.

Q20. Display the names of courses that have more credits than the average course credit.

Q21. Write a PL/SQL block to check if a number is even or odd.

Q22. Write a PL/SQL program to calculate factorial of a number using FOR loop.

SUGGESTED BOOKS

1. Ivan Bayross, Title: SQL, PL/SQL – The Programming Language of Oracle,BPB Publications
2. Silberschatz, Korth & Sudarshan, *Database System Concepts*, McGraw Hill Education
3. Dr. Madhulika Jain, Satish Jain, *DBMS: Complete Practical Approach*, BPB Publications

M.Sc. (CS) Semester: I (2025-26)

Discipline Centric Core Course (DCC)

WTLCC27001P: Web Technology Lab

(60 CIA + 40 EoSE. = Max. Marks: 100)

Course Credits	No. of Teaching Hours Per Week	Total No. of Teaching Hours
2 Credits	4 Hours	60 Hours

SUGGESTED LABORATORY EXCERCISE

1. **Create a basic HTML page** introducing yourself. Include:
   - Headings, Paragraphs, Line breaks
   - Lists (ordered and unordered)
   - Horizontal lines and formatting tags
2. **Create a registration form using HTML5**.
   - Include form elements like text, radio, checkbox, date, number, etc.
3. **Design a web page** to display college/course information using:
   - HTML tables
   - Images and links (internal and external)
4. **Create a personal portfolio site** with multiple pages:
   - Home, About Me, Projects, Contact
   - Navigation using anchor tags and hyperlinking
5. **Apply CSS styling** to an HTML page using:
   - Internal and External CSS
   - Style text, lists, and tables with colors and fonts
6. **Design a responsive layout** using:
   - Flexbox or Grid Layout
   - Media queries for mobile responsiveness
7. **Write a JavaScript program** to:
   - Display current date and time
   - Use alert, prompt, and confirm dialogs
8. **Form validation using JavaScript**:
   - Validate name, email, mobile number, and password fields
9. **Create an interactive web page** using JavaScript:
   - Change text or style dynamically on button click
   - Perform basic calculations (e.g., calculator)
10. **Create a PHP program** to:
    - Accept user input and display output
    - Demonstrate use of variables, operators, and control statements
11. **Design a feedback form**:
    - HTML front-end + PHP backend to collect and display data
12. **Create a PHP login page**:
    - Accept username and password, validate against hardcoded values
13. **Use sessions and cookies in PHP**:
    - Track a user's login session or store preferences

14. **Create a MySQL database and table**:
    - Insert sample student or product data
15. **Develop a simple web app (CRUD operations)**:
    - Create, Read, Update, Delete data using PHP and MySQL
    - Example: Student Information System or Product Inventory

SUGGESTED BOOKS

1. Achyut Godbole, Atul Kahate – Web Technologies: TCP/IP to Internet Application Architectures, McGraw Hill Education
2. Ivan Bayross – Web Enabled Commercial Application Development using HTML, DHTML, JavaScript, Perl CGI, BPB Publications
3. Robin Nixon – Learning PHP, MySQL & JavaScript with jQuery, CSS & HTML5, O'Reilly
4. Jon Duckett – HTML and CSS: Design and Build Websites, Wiley
5. Thomas Powell – JavaScript: The Complete Reference, McGraw Hill
6. Kogent Learning Solutions Inc. – Web Technologies: HTML, JavaScript, PHP, Java, JSP, ASP.NET, Dreamtech Press