

**Mahatma Gandhi University , Nalgonda**  
**B.Sc(Computer Science)-I**  
**I-Semester-Syllabus**

DSC–3A

Programming in C

BS106

Theory 4 Hours/Week 4 credits  
 Practical 2 Hours/Week 1 credit

Lecturer	Topic	Remarks
<b>Unit-I</b>	<b>Chapters: Computer Fundamentals, Program Fundamentals, Algorithms &amp; Basics of C</b>	
Lecturer-1	<b>Computer Fundamentals:</b> Introduction of Computers, Classification of Computers,	
Lecturer-2	Anatomy of Computer	
Lecturer-3	Memory Hierarchy( Primary and Secondary Memories)	
Lecturer-4	Operational Overview of a CPU, Introduction to OS	
Lecturer-5	<b>Program Fundamentals:</b> Generation and Classification of Programming Languages,	
Lecturer-6	Compiling, Interpreting, Loading, Linking of a Program,	
Lecturer-7	Developing Program, Software Development	
Lecturer-8	<b>Algorithms:</b> Definitions, Different Ways of Stating Algorithms	
Lecturer-9	Strategy for Designing Algorithms, Structured Programming Concept.	
Lecturer-10	<b>Basics of C:</b> Overview of C, Developing Programs in C	
Lecturer-11	Parts of Simple C Program, Structure of a C Program, Comments	
Lecturer-12	Program Statements, C Tokens: Keywords, Identifiers	
Lecturer-13	Constants , Variables	
Lecturer-14	Data Types	
Lecturer-15	Operators	
Lecturer-16	Expression Evaluation–precedence and associativity	
Lecturer-17	Type Conversions , Example with program	
<b>Unit-II</b>	<b>Chapters: Input-output functions , Control statements &amp; Arrays and Strings</b>	
Lecturer-18	<b>Input-output functions :</b> Non-formatted and Formatted Input Functions	
Lecturer-19	Non-formatted and Formatted output Functions	
Lecturer-20	Escape Sequences and program	
Lecturer-21	<b>Control Statements:</b> Selection Statements – if, if-else with programs	
Lecturer-22	Selection Statements- nested if, nested if-else with programs	
Lecturer-23	Selection Statements- conditional operator, switch with programs	
Lecturer-24	Iterative Statements: while with programs	
Lecturer-25	Iterative Statements: do- while and for with programs	

Lecturer-26	Special Control Statement–goto, break, continue, return, exit.	
Lecturer-27	<b>Arrays and Strings:</b> One-dimensional Arrays(Declaration, Initialization, Example with program)	
Lecturer-28	Multi-dimensional Arrays(Declaration, Initialization, Example )	
Lecturer-29	programs to find the Sum, Product of two matrices	
Lecturer-30	Character Arrays( Declaration, Initialization, Example with program)	
Lecturer-31	String Functions from ctype.h, string.h explanation	
<b>Unit-III</b>	<b>Chapters: Functions, Pointers</b>	
Lecturer-32	<b>Functions:</b> Concept of Function(Definition, Declaration, Definition, calling of functions ),	
Lecturer-33	Using Functions (Predefined, User defined)	
Lecturer-34	Passing Arrays to Functions, Scope of Variables,	
Lecturer-35	Storage Classes	
Lecturer-36	Inline Functions, and Recursion(Syntax, Example with program)	
Lecturer-37	<b>Pointers:</b> Introduction, Address of Operator (&), Pointer, Uses of Pointers,	
Lecturer-38	Pointers and Strings,	
Lecturer-39	Pointers to Pointers	
Lecturer-40	Array of Pointers, Pointer to Array,	
Lecturer-41	Dynamic Memory Allocation	
Lecturer-42	Call-by-Value (Definitions, Example with programs)	
Lecturer-43	Call-by-reference(Definitions, Example with programs and Call-by-Value Vs Call-by-reference Differences)	
<b>Unit-IV</b>	<b>Chapters: User-defined Data Types, Files</b>	
Lecturer-44	Introduction to User-defined Data Types(Structure, Union Enumeration Types)	
Lecturer-45	Declaring a Structure and its members, Initialization Structure	
Lecturer-46	Accessing members of a Structure example with program	
Lecturer-47	Array of Structures example with program	
Lecturer-48	Declaring a Union and its members, Initialization Union Accessing members of a Union example with program	
Lecturer-49	Array of Union example with program	
Lecturer-50	Structures verses Unions, Enumeration Types.	
Lecturer-51	<b>Files:</b> Introduction, Using Files in C( File IO functions)	
Lecturer-52	Working with Text Files	
Lecturer-53	Working with Binary Files	
Lecturer-54	Files of Records	
Lecturer-55	Random Access to Files of Records	
Lecturer-56	Other File Management Functions	

Lecturer-57	Revision Unit-I	
Lecturer-58	Revision Unit-II, Revision Unit-III	
Lecturer-59	Revision Unit-III and IV	
Lecturer-60	Model Paper discussion	

**Text Book:** Pradip Dey, Manas Ghosh, Computer Fundamentals and Programming in C (2e)

- References**
- Ivor Horton, Beginning C
  - Ashok Kamthane, Programming in C
  - Herbert Schildt, The Complete Reference C
  - Paul Deitel, Harvey Deitel, C How To Program
  - Byron S. Gottfried, Theory and Problems of Programming with C
  - Brian W. Kernighan, Dennis M. Ritchie, The C Programming Language
  - B. A. Forouzan, R. F. Gilberg, A Structured Programming Approach Using C

**Mahatma Gandhi University , Nalgonda**  
**B.Sc(Computer Science)-II**  
**II-Semester-Syllabus**

DSC–3B

Programming in C++

BS206

Theory 4 Hours/Week 4 credits  
 Practical 2 Hours/Week 1 credit

Lecturer	Topic	Remarks
<b>Unit-I</b>	<b>Chapters:</b> Introduction to C++, Functions, Object Oriented Programming	
Lecturer-1	<b>Introduction to C++:</b> Applications, Example Programs(cin, cout statements )	
Lecturer-2	Tokens, Data Types	
Lecturer-3	Operators, Expressions	
Lecturer-4	Control Structures(Selection statements: if, if-else, nested if-else, switch statements)	
Lecturer-5	Control Structures(Iterative statements: While, do-while and for)	
Lecturer-6	Arrays	
Lecturer-7	Strings	
Lecturer-8	Pointers	
Lecturer-9	Searching and Sorting Arrays(Definitions, simple programs)	
Lecturer-10	<b>Functions:</b> Introduction, Prototype, Passing Data by Value, Reference Variables,	
Lecturer-11	Using Reference Variables as Parameters	
Lecturer-12	Inline Functions, Default Arguments	
Lecturer-13	Overloading Function	
Lecturer-14	Passing Arrays to Functions	
Lecturer-15	<b>Object Oriented Programming:</b> Procedural and Object-Oriented Programming Terminology	
Lecturer-16	Terminology (continuation) , Benefits	
Lecturer-17	OOP Languages, and OOP Applications	
<b>Unit-II</b>	<b>Chapters: Classes</b>	
Lecturer-18	Introduction, Defining an Instance of a Class	
Lecturer-19	Access specifiers(private, public, protected)	
Lecturer-20	why have private members? separating class specification from implementation,	
Lecturer-21	Inline Member Functions,	
Lecturer-22	Constructors, Passing Arguments to Constructors,	
Lecturer-23	Copy Constructors, Destructors with example program	
Lecturer-24	Overloading Constructors	
Lecturer-25	Private Member Functions	
Lecturer-26	Arrays of Objects,	

Lecturer-27	Instance and Static Members, Member-wise Assignment,	
Lecturer-28	Friends of Classes	
Lecturer-29	Operator Overloading	
Lecturer-30	Object Conversion, Aggregation	
<b>Unit-III</b>	<b>Chapters: Inheritance, Polymorphism &amp; C++ Streams</b>	
Lecturer-31	<b>Inheritance:</b> Introduction(Definition, Types)	
Lecturer-32	Defining a Sub-class from Super class syntax	
Lecturer-33	Protected Members and Class Access	
Lecturer-34	Base Class Access Specification	
Lecturer-35	Constructors and Destructors in Base and Derived Classes	
Lecturer-36	Multiple Inheritance.	
Lecturer-37	Class Hierarchies(multi level)	
Lecturer-38	Redefining Base Class Functions	
Lecturer-39	<b>Polymorphism :</b> Types of Polymorphism (static and dynamic)	
Lecturer-40	Virtual Member Functions	
Lecturer-41	Abstract Base Classes	
Lecturer-42	Pure Virtual Functions	
Lecturer-43	<b>C++ Streams:</b> Stream Classes	
Lecturer-44	Unformatted I/O Operations	
Lecturer-45	Formatted I/O Operations	
<b>Unit-IV</b>	<b>Chapters: Exceptions, Templates</b>	
Lecturer-46	<b>Exceptions:</b> Introduction, throwing an exception, handling an exception	
Lecturer-47	Example program in exception handling(without class)	
Lecturer-48	Object-Oriented Exception Handling with Classes	
Lecturer-49	Multiple Exceptions	
Lecturer-50	Extracting Data from the Exception Class	
Lecturer-51	Re-throwing an Exception, Handling the bad_alloc Exception	
Lecturer-52	<b>Templates:</b> Function Templates–Introduction, Function Templates	
Lecturer-53	Function Templates with Multiple Type	
Lecturer-54	Overloading with Function Templates	
Lecturer-55	Class Templates Introduction,	
Lecturer-56	Defining Objects of the Class Template	
Lecturer-57	Class Templates and Inheritance,	
Lecturer-58	Introduction to the STL	
Lecturer-59	Revision Unit-I, Revision Unit-II	
Lecturer-60	Revision Unit-III and IV	

**Text** Tony Gaddis, Starting out with C++: from control structures through objects (7e)

**References** B. Lippman, C++ Primer

Bruce Eckel, Thinking in C++

K.R. Venugopal, Mastering C++

Herbert Schildt, C++: The Complete Reference

Bjarne Stroustrup, The C++ Programming Language

Sourav Sahay, Object Oriented Programming with C++

**Mahatma Gandhi University , Nalgonda**  
**B.Sc(Computer Science)-III**  
**III-Semester-Syllabus**

DSC–3C

Data Structures

BS306

Theory 4 Hours/Week 4 credits

Practical 2 Hours/Week 1 credit

Lecturer	Topic	Remarks
<b>Unit-I</b>	<b>Chapters: Fundamental Concepts, Linear Data Structure Using Arrays &amp; Stacks</b>	
Lecturer-1	Introduction to Data Structures, Types of Data Structures,	
Lecturer-2	Introduction to Algorithm( Characteristics)	
Lecturer-3	Pseudo-code, Flow Chart	
Lecturer-4	Analysis of Algorithms(Complexity of Algorithms)	
Lecturer-5	Analysis of Algorithms(Computing time complexity, Big –O Notation)	
Lecturer-6	Linear Data Structure Using Arrays: 1-D Arrays(Memory Representation and Address Calculation)	
Lecturer-7	2-D Arrays, N-D Arrays (Memory Representation and Address Calculation)	
Lecturer-8	Concept of Ordered List Pros and Cons of Arrays.	
Lecturer-9	String Manipulation	
Lecturer-10	<b>Stacks:</b> Concept, Primitive Operations	
Lecturer-11	Abstract Data Type( ADT Stack methods), Representation Stacks Using Arrays	
Lecturer-12	Program on Stack ADT	
Lecturer-13	Prefix, Infix, Postfix Notations for Arithmetic Expression	
Lecturer-14	Applications of Stacks– Converting Infix Expression to Postfix Expression(with examples)	
Lecturer-15	Evaluating the Postfix Expression	
Lecturer-16	Checking Well-formed (Nested) Parenthesis	
Lecturer-17	Processing of Function Calls, Reversing a String.	
<b>Unit-II</b>	<b>Chapters: Recursion, Queues, Linked Lists,</b>	
Lecturer-18	<b>Recursion:</b> Introduction, Recurrence	
Lecturer-19	Use of Stack in Recursion	
Lecturer-20	Variants of Recursion	
Lecturer-21	Execution of Recursive Calls, Iteration versus Recursion	
Lecturer-22	Recursive Functions	
Lecturer-23	<b>Queues:</b> Concept, Primitive Operations	
Lecturer-24	Abstract Data Type, Representation Queues Using Arrays	
Lecturer-25	Circular Queue,	
Lecturer-26	Double-Ended Queue, Applications of Queues(List)	

Lecturer-27	<b>Linked Lists:</b> Introduction, Concept, Terminology,	
Lecturer-28	Representation of Linked Lists, Linked List Abstract Data Type	
Lecturer-29	Linked List Variants	
Lecturer-30	Singly Linked List(Primitive Operations-creating, inserting, deleting, traversing)	
Lecturer-31	Doubly Linked List, Circular Linked List (Concepts)	
Lecturer-32	Representation Stacks Using Linked Singly Lists	
Lecturer-33	Representation Queue Using Linked Singly Lists	
Lecturer-34	Application of Linked List–Garbage Collection	
<b>Unit-III</b>	<b>Chapters: Trees, Graphs, Hashing</b>	
Lecturer-35	<b>Trees:</b> Introduction, Terminology, Representation of a General Tree,	
Lecturer-36	Binary Tree Introduction, Binary Tree Abstract Data Type	
Lecturer-37	Implementation of Binary Trees(Array, Linked representation)	
Lecturer-38	Binary Search Tree , Inserting a Node into a binary tree,	
Lecturer-39	Binary Tree Traversals – Preorder, Inorder, Postorder Traversals,	
Lecturer-40	Applications of Binary Trees Briefly	
Lecturer-41	Graphs: Introduction, Graph Abstract Data Type,	
Lecturer-42	Representation of Graphs,	
Lecturer-43	Graph Traversal – Depth-First Search, Breadth-First Search,	
Lecturer-44	Spanning Tree , MST, – Prim’s Algorithm	
Lecturer-45	Spanning Tree – Kruskal’s Algorithm	
Lecturer-46	<b>Hashing:</b> Introduction, Hash Functions,.	
Lecturer-47	Collision Resolution Strategies	
<b>Unit-IV</b>	<b>Chapters: Searching , Sorting and Heaps</b>	
Lecturer-48	Sequential (Linear) Search	
Lecturer-49	Binary Search	
Lecturer-50	Bubble Sort,	
Lecturer-51	Insertion Sort	
Lecturer-52	Selection Sort,	
Lecturer-53	Quick Sort	
Lecturer-54	Merge Sort , Comparison of Sorting Techniques	
Lecturer-55	Heaps: Concept and Examples	
Lecturer-56	Implementation	
Lecturer-57	Abstract Data Type	
Lecturer-58	Heap Sort.	
Lecturer-59	Revision Unit-I, Revision Unit-II	
Lecturer-60	Revision Unit-III and IV	



**Text** Varsha H. Patil, Data Structures Using C++

**References** Nell Dale, C++ Plus Data Structures

Seymour Lipschutz, Data Structures (Revised 1e)

Adam Drozdek, Data Structures and Algorithms in C++

Mark Allen Weiss, Data structures and Algorithm Analysis in C++ (4e)

D.S. Malik, C++ Programming: Program Design Including Data Structures (6e)

Michael Main, Walter Savitch, Data Structures and Other Objects Using C++ (4e)

Michael T. Goodrich, R. Tamassia, David M. Mount, Data Structures and Algorithms in C++

Yonghui Wu, Jiande Wang, Data Structure Practice for Collegiate Programming Contests  
and Education

**Mahatma Gandhi University , Nalgonda**  
**B.Sc(Computer Science)-IV**  
**IV-Semester-Syllabus**

DSC–3D

Data Base Management Systems

BS406

Theory 4 Hours/Week 4 credits  
 Practical 2 Hours/Week 1 credit

Lecturer	Topic	Remarks
<b>Unit-I</b>	<b>Chapters: Introduction to Databases, Relational Model, The Relational Algebra</b>	
Lecturer-1	Introduction to Databases: Introduction,	
Lecturer-2	Traditional File-Based Systems	
Lecturer-3	Database Approach,	
Lecturer-4	Roles in the Database Environment	
Lecturer-5	Advantages of DBMSs	
Lecturer-6	Disadvantages of DBMSs	
Lecturer-7	The Three-Level ANSI-SPARC Architecture	
Lecturer-8	Database Languages, Data Models(Object based)	
Lecturer-9	Data Models(Record based)	
Lecturer-10	Functions of a DBMS	
Lecturer-11	Components of a DBMS	
Lecturer-12	<b>Relational Model:</b> Introduction, Terminology,	
Lecturer-13	Integrity Constraints, Views.	
Lecturer-14	<b>The Relational Algebra:</b> Unary Operations, Set Operations	
Lecturer-15	Join Operations	
Lecturer-16	Division Operation, Aggregation and Grouping Operations.	
<b>Unit-II</b>	<b>Chapters: SQL DDL, DML, Advanced SQL</b>	
Lecturer-17	SQL: Introduction, SQL Data Types,	
Lecturer-18	Integrity Enhancement Feature–Domain Constraints, Entity Integrity, Referential Integrity, General Constraints,	
Lecturer-19	Data Definition–Creating a Database,	
Lecturer-20	Creating a Table	
Lecturer-21	Changing a Table Definition, Removing a Table	
Lecturer-22	Creating an Index, Removing an Index	
Lecturer-23	SQL DML: Insert, update,	
Lecturer-24	delete and select data from database	

Lecturer-25	Simple Queries, Sorting Results	
Lecturer-26	Using the SQL Aggregate Functions, Grouping Results	
Lecturer-27	Sub-queries, ANY and ALL	
Lecturer-28	Multi-table Queries	
Lecturer-29	EXISTS and NOT EXIST, Combining Result Tables,	
Lecturer-30	Views–Creating a View, Removing a View, View Resolution, Restrictions on Views, View Updatability, WITH CHECK OPTION,	
Lecturer-31	Advantages and Disadvantages of Views, View Materialization	
Lecturer-32	Transactions, Discretionary Access Control–Granting Privileges to Other Users, Revoking Privileges from Users.	
Lecturer-33	<b>Advanced SQL:</b> The SQL Programming Language–Declarations, Assignments	
Lecturer-34	Control Statements	
Lecturer-35	Exceptions, Cursors	
Lecturer-36	Subprograms, Stored Procedures, Functions, and Packages	
Lecturer-37	Triggers, Recursion	
<b>Unit-III</b>	<b>Chapters: Entity–Relationship Modeling, Enhanced Entity–Relationship Modeling, Functional–Dependencies, Normalization</b>	
Lecturer-38	Entity Types, Relationship Types	
Lecturer-39	Attributes, Keys	
Lecturer-40	Strong and Weak Entity Types, Attributes on Relationships	
Lecturer-41	Structural Constraints	
Lecturer-42	Problems with ER Models–Fan Traps, Chasm Traps.	
Lecturer-43	Enhanced Entity–Relationship Modeling: Specialization/Generalization	
Lecturer-44	Aggregation, Composition	
Lecturer-45	Functional–Dependencies: Anomalies, Partial Functional Dependency, Transitive Functional Dependency, Multi Valued Dependency, Join Dependency.	
Lecturer-46	Normalization: The Purpose of Normalization,	
Lecturer-47	The Process of Normalization, 1NF, 2NF	
Lecturer-48	3NF, BCNF with example	
<b>Unit-IV</b>	<b>Chapters: Transaction Management, Security</b>	
Lecturer-49	Transaction Support–Properties of Transactions	
Lecturer-50	Database Architecture, Concurrency Control–The Need for Concurrency Control	
Lecturer-51	Serializability and Recoverability	
Lecturer-52	Locking Methods, Deadlock	
Lecturer-53	Time Stamping Methods, Optimistic Techniques	

Lecturer-54	Granularity of Data Items,	
Lecturer-55	Database Recovery–The Need for Recovery, Transactions and Recovery,	
Lecturer-56	Recovery Facilities, Recovery Techniques	
Lecturer-57	Recovery Techniques , Nested Transaction Mode	
Lecturer-58	<b>Security</b> Data Base Security, Threats	
Lecturer-59	Computer-Based Controls–Authorization, Access Controls, Views, Backup and Recovery, Integrity	
Lecturer-60	Encryption, RAID.	

**Text :**

Thomas M. Connolly, Carolyn E. Begg, Database Systems–A Practical Approach to Design, Implementation, and Management (6e)

**References :**

Sharon Allen, Evan Terry, Beginning Relational Data Modeling  
 Jeffrey A. Hoffer, V. Ramesh, Heikki Topi, Modern Database Management  
 Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems  
 Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems  
 Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System  
 Concepts C Coronel, S Morris, Peter Rob, Database Systems: Design,  
 Implementation, and Management