

MANGALORE UNIVERSITY



State Education Policy – 2024 [SEP-2024]

CURRICULUM STRUCTURE

FOR

BSC-COMPUTER SCIENCE

MANGALORE UNIVERSITY

Suggested programme structure for the Under Graduate Programmes

Bachelor of Science-B.Sc.

Semester	Course 1	Course 2	Course 3	Elective / Optional	Course	Language	Compulsory	Total Credit	Total Working hour
I	5 (3T+2P)	5 (3T+2P)	5 (3T+2P)			3+3	2	23	4+4+4+4+4+4+4+4+2=34
II	5 (3T+2P)	5 (3T+2P)	5 (3T+2P)			3+3	2	23	4+4+4+4+4+4+4+4+2=34
III	5 (3T+2P)	5 (3T+2P)	5 (3T+2P)	2		3+3		23	4+4+4+4+4+4+4+4+2=34
IV	5 (3T+2P)	5 (3T+2P)	5 (3T+2P)	2		3+3	2	25	4+4+4+4+4+4+4+4+2+2= 36
V	8[(2x3T)+2P]	8[(2x3T)+2P]	8[(2x3T)+2P]				2	26	3+3+4+3+3+4+3+3+4+2= 32
VI	8[(2x3T)+2P]	8[(2x3T)+2P]	8[(2x3T)+2P]				2	26	3+3+4+3+3+4+3+3+4+2= 32
								146	202

Note:

- **Course1, Course2 and Course3: I to IV Semester: Theory 3 credit=4 contact hours & Practical 2 credit=4 contact hours**
- **Course1, Course2 and Course3: V and VI Semester: 3 credit=3 contact hours& Practical 2 credit=4 contact hours**
- **Elective/Optional: 2 credit=2 contact hours**
- **Languages: 3 credit=4 contact hours**
- **Compulsory: 2 credit=2 contact hours**

CURRICULUM STRUCTURE FOR I TO VI SEMETER BSC-COMPUTER SCIENCE

Semester I								
Sl. No	Course Code	Title of the Course	Category of Courses	Teaching Hours per Week	SE E	IA	Total Marks	Credits
1		Computer Fundamentals and Programming in C	Theory	4	80	20	100	3
2		C Programming Lab	Practical	4	40	10	50	2

Semester II								
Sl. No	Course Code	Title of the Course	Category of Courses	Teaching Hours per Week	SE E	IA	Total Marks	Credits
1		Data Structures	Theory	4	80	20	100	3
2		Data Structures Lab	Practical	4	40	10	50	2

Semester III								
Sl. No	Course Code	Title of the Course	Category of Courses	Teaching Hours per Week	SE E	IA	Total Marks	Credits
1		Object Oriented Programming using Java	Theory	4	80	20	100	3
2		Object Oriented Programming Lab	Practical	4	40	10	50	2

2	A. Digital Marketing	Elective	2	40	10	50	2
	B. Web Content Management						
	C. Computer Organization						

Semester IV								
Sl. No	Course Code	Title of the Course	Category of Courses	Teaching Hours per Week	SE E	IA	Total Marks	Credits
1		Database Management System	Theory	4	80	20	100	3
2		DBMSLab	Practical	4	40	10	50	2
3		A) Cloud Computing B) Internet Basics C) Cyber Security	Elective	2	40	10	50	2
4		Data Analytics using Excel	Compulsory	2	40	10	50	2

Semester V								
Sl. No	Course Code	Title of the Course	Category of Courses	Teaching Hours per Week	SE E	IA	Total Marks	Credits
1		Programming in Python	Theory	3	80	20	100	3
2		Operating Systems	Theory	3	80	20	100	3
3		Python and Linux Lab	Practical	4	80	20	100	2
4		Artificial	Compulsory	2	40	10	50	2

		Intelligence						
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Semester VI								
Sl. No	Course Code	Title of the Course	Category of Courses	Teaching Hours per Week	SE E	IA	Total Marks	Credits
1		Statistical Computing and R Programming	Core	3	80	20	100	3
2		Web Technologies	Core	3	80	20	100	3
3		R Programming and Web Technologies Lab	Practical	4	80	20	100	2
4		Computer Hardware and Maintenance	Compulsory	2	40	10	50	2

SEMESTER I

Program Name	BSC-COMPUTER SCIENCE	Semester	I
Course Title	Computer Fundamentals and Programming in C(Theory)		
Course Code:	BSC-CSC-1.1	No.of Credits	03
Contact hours	4 Hours per week	Duration of SEA/Exam	3hours
Formative Assessment Marks	20	Summative Assessment Marks	80

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Operate desktop computers to carry out computational tasks
- Understand working of hardware and software and the importance of operating systems
- Understand programming languages, Generations of Languages, Translator programs
- Read, understand and trace the execution of programs written in C language
- Write the C code for a given problem
- Perform input and output operations using programs in C
- Write programs that perform operations on arrays

Unit	Description	Hours
1	Characteristics of computers Generations of computers, Classification of computers. Computer system, applications of computers. Computer Software – Categories of software. Computer Programming Languages–Machine Level, Assembly level and High-level languages; Translator Programs – Assembler, Interpreter and Compiler. Developing a computer program, Program Development Cycle - Algorithm, Flowchart and Pseudocode with examples. Introduction to C Programming: Overview of C; History and	13

	<p>Importance of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C.</p> <p>C Programming Basic Concepts: C Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration and initialization of variables; Symbolic constants.</p>	
2	<p>C Operators and Expressions: Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment & Decrement operators; Bitwise operators; Conditional operator; Special operators; Operator Precedence and Associativity. Evaluation of arithmetic expressions; Type conversion.</p> <p>Input and output with C: Formatted I/O functions - printf and scanf, control strings and escape sequences, output specifications with printf functions; Unformatted I/O functions to read and display single character and a string - getchar, putchar, gets and puts functions.</p> <p>Control Structures: Branching: if, if-else, nested if, else-if ladder, switch.</p> <p>Looping: while, do-while and for loop, nested loops, exit, break, jumps in loops.</p>	13
3	<p>Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation.</p> <p>Character and Strings: Character handling functions - toascii, toupper, tolower, isalpha, isnumeric etc.</p> <p>Declaring and Initializing string variables; String handling functions - strlen, strcmp, strcpy and strcat;</p> <p>User-Defined Functions: Need for user defined functions; Format of C user defined functions; Components of user defined functions - return type, name, parameter list, function body, return statement and function call; Categories of user defined functions - With and without parameters and return type.</p> <p>Nesting of functions, Recursion, and functions with arrays, the scope, visibility & lifetime of variables (Storage classes).</p>	13
4	<p>Structures and Union- Structure Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure members initialization, comparing structure variables, Array of</p>	

	<p>Structures; Unions - Union definition; difference between Structures and Unions.</p> <p>Pointers: Understanding pointers - Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays; Pointer Arithmetic.</p> <p>File Management: Basic file operations, types of files. Creating text file. Modes of opening a file, formatted and unformatted i/o operations.</p> <p>Preprocessor: Macro substitution and file inclusion.</p>	13
<p>Text Books:</p> <ol style="list-style-type: none"> 1. ITL Education Solution Limited, Introduction to Information Technology, Second Edition 2018, Pearson Education. 2. E. Balagurusamy: Programming in ANSI C (TMH), 7th Edition. <p>Reference Books :</p> <ol style="list-style-type: none"> 1. Kamthane: Programming with ANSI and TURBO C (Pearson Education) 2. V. Rajaraman: Programming in C (PHI – EEE) 3. S. Byron Gottfried: Programming with C (TMH) 4. Kernighan & Ritchie: The C Programming Language (PHI) 5. Yashwant Kanitkar: Let us C 6. P.B. Kottur: Programming in C (Sapna Book House) 7. Pradeep K. Sinha and Priti Sinha: Computer Fundamentals (Sixth Edition), BPB Publication. 		

Pedagogy: Lecture/ PPT/ Videos/ Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe- Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/ Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

Program Name	BSC-COMPUTER SCIENCE	Semester	I
Course Title	C Programming Lab		
Course Code:	BSC-CSC-1.2	No.of Credits	02
Contact hours	4 Hours per week	Duration of SEA/Exam	3 hours
Formative Assessment Marks	10	Summative Assessment Marks	40

PART – A

1. Program to check for prime number.
2. Program to generate n Fibonacci numbers.
3. Program to read a multi – digit number find the sum of the digits, reverse the number and check it for palindrome.
4. Program to find the roots of quadratic equation (Demonstration of switch Statement).
5. Program to count occurrences of each character in a string.
6. Program to read ‘n’ integer values into a single dimension array and arrange them in ascending order using bubble sort method
7. Program to find the largest and smallest elements with their position in a one-dimensional array.
8. Program to multiply two matrices.

PART-B

1. Program to accept ‘n’ and find the sum of the series $1! + 3! + 5! + \dots + n!$
2. Write user-defined functions to (a) find the length of a string (b) concatenate two strings. Call these functions in the main program
3. Program to find whether a given string is palindrome or not (Use a function to reverse a string using pointers)
4. Program to add two matrices using pointers.
5. Program to display the first ‘n’ Fibonacci numbers using a function to generate the nth Fibonacci number
6. Program to find the GCD of ‘n’ integers using a function to compute the GCD of two integers

7. Program to enter the information of n students (name, register number, marks in three subjects) into an array of structures. Compute and print the result of all students. For passing, student should get at least 35 in each subject, otherwise result is "FAIL". If the student passes and if percentage ≥ 70 , result is DISTINCTION; If percentage is < 70 and ≥ 60 , result is FIRST CLASS; if percentage is < 60 and ≥ 50 , result is SECOND CLASS; otherwise result is PASS CLASS. Get the output of all students in a tabular form with proper column headings
8. Program to prepare the pay slip of 'n' employees using an array of structures. Input the employee name, employee number and basic pay. Calculate the DA, HRA, PF, PT, Gross Pay and Net Pay as follows:

If Basic < 40000 , DA = 50% of Basic, HRA = 12% of Basic, PF = 12% of Gross Pay, PT = 250.

Otherwise DA = 40% of Basic, HRA = 10% of Basic, PF = 13% of Gross, PT = 300.

Gross Pay = Basic + DA + HRA and Net Pay = Gross Pay – PF – PT

Evaluation Scheme for Lab Examination:

Assessment Criteria		
Program-1	PART-A Writing:7 Marks Execution:8Marks	15Marks
Program-2	PART-B Writing:10 Marks Execution:10 Marks	20 Marks
Practical Record		05 Marks
Total		40 Marks

SEMESTER II

Program Name	BSC-COMPUTER SCIENCE	Semester	II
Course Title	Data Structures(Theory)		
Course Code:	BSC-CSC-2.1	No.of Credits	03
Contact hours	4 Hours per week	Duration of SEA/Exam	3 hours
Formative Assessment Marks	20	Summative Assessment Marks	80

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
- Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs
- Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs
- Demonstrate different methods for traversing trees
- Compare alternative implementations of data structures with respect to performance
- Describe the concept of recursion, give examples of its use
- Discuss the computational efficiency of the principal algorithms for sorting and searching

Unit	Description	Hours
1	Introduction to Data Structures: Definition, Need for Data Structures, Types of Data Structures. Linear Data Structures: Arrays - Definition, Declaration and storage of one-and two-dimensional arrays. Sparse matrices. Recursion: Definition; Types of recursion; Recursion Technique Examples – Fibonacci numbers, GCD, Binomial coefficient ${}^n C_r$,	13

	<p>Comparison between iterative and recursive functions.</p> <p>Sorting: Sorting Selection sort, Bubble sort, Quicksort, Insertion sort; Comparison of Different sorting techniques.</p>	
2	<p>Searching: Introduction, Linear search, Binary Search, Comparison of different searching techniques.</p> <p>Dynamic memory allocation: Static and Dynamic memory allocation; Memory allocation and deallocation functions - <i>malloc, calloc, realloc</i> and <i>free</i>.</p> <p>Linked List: Introduction, characteristics, types of linked lists, Representation of singly linked list in memory, Singly linked list – Operations, algorithms, Representation of polynomials using linked lists. Circular linked list – Operations, Doubly linked list – operations. Memory allocations.</p>	13
3	<p>Stacks: Array representation of stacks, Linked representation of stacks, operations, Applications of stacks Recursion, Implementation of recursive procedure by stack (Factorial function and Fibonacci sequence).</p> <p>Arithmetic Expressions: Prefix, infix and postfix notation, infix to postfix conversion, evaluation of postfix expression.</p> <p>Queues: Array representation of queue, Linked representation of queue, Types of queues - Simple queue, circular queue, double-ended queue, priority queue, operations on queues.</p>	13
4	<p>Trees: Definition; Tree terminologies – node, root node, parent node, ancestors of a node, siblings, terminal and non-terminal nodes, degree of a node, level, edge, path, depth;</p> <p>Binary tree: Types of binary trees - strict binary tree, complete binary tree, binary search tree. Array representation of binary tree. Traversal of binary tree; <i>preorder, inorder</i> and <i>postorder</i> traversal; Construction of a binary tree when <i>inorder</i> and <i>pre/postorder</i> traversals are given.</p> <p>Graphs: Terminologies, Matrix representation of graphs, Traversals: Breadth First Search and Depth first search.</p>	13

Text Books:

1. Sartaj Sahni: Fundamentals of Data Structures.
2. Yedidyah Langsam, Moshe J. Augenstein and Aaron M. Tenenbaum, Data Structures Using C and C++, 2nd Edition, PHI Publication
3. Seymour Lipschutz, Schaum's Outlines Series, Data Structures with C, Tata McGraw Hill 2011

Reference Books:

1. Kamathane: Introduction to Data structures (Pearson Education)
2. Y. Kanitkar: Data Structures Using C (BPB)
3. Kottur: Data Structure Using C
4. Padma Reddy: Data Structure Using C
5. Sudipa Mukherjee: Data Structures using 1000 Problems and Solutions (McGraw Hill Education, 2007) C

Pedagogy: Lecture/ PPT/ Videos/ Animations/ Role Plays/ Think-Pair-Share/ Predict-Observe- Explain/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/ Activity/ Flipped Classroom/ Jigsaw/ Field based Learning/ Project Based Learning/ Mini Projects/ Hobby Projects/ Forum Theatre/ Dance/ Problem Based Learning/ Game Based Learning/ Group Discussion/ Collaborative Learning/ Experiential Learning / Self Directed Learning etc.

Program Name	BSC-COMPUTER SCIENCE	Semester	II
Course Title	Data Structures Lab		
Course Code:	BSC-CSC-2.2	No.of Credits	02
Contact hours	4 Hours per week	Duration of SEA/Exam	3 hours
Formative Assessment Marks	10	Summative Assessment Marks	40

PART-A

1. Program to compute power of a number using a recursive function.
2. Program to read the names of the cities and arrange them alphabetically.
3. Program to sort the given list using selection sort technique.
4. Program to sort the given list using bubble sort technique.
5. Program to sort the given list using quick sort technique.
6. Program to sort the given list using insertion sort technique.
7. Program to search an element using linear search technique.
8. Program to search an element using recursive binary search technique.

PART-B

1. Program to implement queue using arrays.
2. Program to implement stack using arrays.
3. Write a Program for converting an Infix Expression to Postfix Expression. Program should support both parenthesized and free parenthesized expressions with the following operators: +, -, *, /, % (Remainder), ^ (Power) and alphanumeric operands.
4. Program to implement all operations on a sorted singly linked list.
5. Program to implement queue using linked list.
6. Program to implement circular queue using array.
7. Write a menu driven program for the following operations on Binary Search Tree (BST) of integers
 - (a) Create a BST of 'n' Integers.

- (b) Traverse the BST in Inorder, Preorder and Postorder.
- (c) Search the BST for a given element and report the appropriate message.
- 8. Program for the following operations on a graph (G) of cities:
 - (a) Create a graph of N cities using Adjacency Matrix.
 - (b) Print all the nodes reachable from a given starting node in a digraph using BFS method.

Evaluation Scheme for Lab Examination:

Assessment Criteria		
Program-1	PART-A Writing:7 Marks Execution:8Marks	15Marks
Program-2	PART-B Writing:10 Marks Execution:10 Marks	20 Marks
Practical Record		05 Marks
Total		40 Marks

Questions Paper for Pattern Core Subjects

Duration:3 Hours

Max.Marks:80

Note: Answer any ten Questions from Part-A. And one full Questions from each unit in Part-B

Part-A

1.

10*2=20

- a.
- b.
- c.
- d.
- e.
- f.
- g.
- h.
- i.
- j.
- k.
- l.

Part-B

UNIT-I, II, III, IV

Each unit contains two main questions and it carry 15 Marks.

Each main questions contain 2 or more sub question.

4*15=60

UNIT-I

2.

- a.
- b.
- c.

3.

- a.
- b.
- c.