

TUMKUR



UNIVERSITY

Board of Studies in Computer Science

Curriculum Structure and Syllabus for I and II Semester

Computer Science for Bachelor of Science

Choice Based Credit System

2024-25 Onwards

Handwritten signatures in blue ink:
Suresh
Ashoka Bhat
Hemant
Jalmit

Handwritten signature in blue ink:
Prakash
Tumkur University
Board of Studies in Computer Science
Tumkur

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11.	Dr. Haridas S. Associate Professor Department of Computer Science Government First Grade College, Tumkur.	Member

SEMESTER – I

Sl. No	Paper	Title of the Paper	Instruction Hrs. per Week	No. of Credits	Duration of the Exam.	Marks		
						Internal Assessment	Semester End Exam.	Total
1	BSCT 101	Computer Fundamentals and Programming in C	4	4	3 Hrs.	20	80	100
2	BSCP 102	Programming in C Lab	4	2	3 Hrs.	10	40	50
TOTAL				6				150

SEMESTER – II

Sl. No	Paper	Title of the Paper	Instruction Hrs. per Week	No. of Credits	Duration of the Exam.	Marks		
						Internal Assessment	Semester End Exam.	Total
1	BSCT 201	Data Structure and Operating Systems	4	4	3 Hrs.	20	80	100
2	BSCP 202	Data Structure and Linux Lab	4	2	3 Hrs.	10	40	50
TOTAL				6				150

NOTE: Theory: 1 Hr. = 1 Credit.

BSCT: BSc Core Paper Theory

BSCP: BSc Core Paper Practical

Practical: 2 Hrs. = 1 Credit

Internal Assessment Marks for Theory and Practical

Internal Assessment Marks Allotment for Theory	
Internal Test 1	05
Internal Test 2	05
Assignment	05
Seminar/Quiz	05
TOTAL	20

Internal Assessment Marks Allotment for Practical	
Internal Test	05
Record and Attendance	05
TOTAL	10

Evaluation Scheme for Lab Examination

Assessment Criteria	
Writing 2 Programs	10
Execution of 2 Programs	20
Viva	10
Total	40 Marks

First Semester			
Subject Name: Computer Fundamentals and Programming in C			
Subject Code	BSCT 101	CIE Marks	20
No of Hours/Week:	4	SEE Marks	80
Total Hours:	60	Credits	4

COURSE OBJECTIVES:

1. To prepare students understand various number systems
2. To acquire the basic knowledge of digital logic levels and application of knowledge to
3. understand digital electronics circuits.
4. To learn the fundamentals of computers.
5. To understand the Basic concepts and logic in program development.
6. To learn the syntax and semantics of the Programming in C language.
7. To learn the usage of structured programming approaches in solving problems.

COURSE OUTCOMES:

At the end of the course students will be able to:

1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
2. To write algorithms and to draw flowcharts for solving problems.
2. Use the 'C' language constructs in the right way
3. Design, develop and test programs written in 'C'
4. To decompose a problem into functions and to develop modular reusable code.

Unit 1	Computer Fundamentals and Organization	Hours 15
	Introduction, Evolution of Computers—A Brief History, Classification of Computers, Anatomy of a Computer, Basic Organization of a Computer, Number System: Binary – Decimal – Conversion – Problems. Boolean Algebra: Logical gates - Combinational Circuits. Types of Programming Languages, Translators. Need for Logical Analysis and Thinking, Algorithm – Pseudocode – Flowchart, Problem Formulation Problem Solving.	
Unit 2	C Programming Basics	Hours 12
	Introduction to “C” Programming – Fundamentals – Features of C, Structure of a C Program, Compilation and Linking Processes. C Programming Basic Concepts – Tokens- Identifiers, Keywords, Constants, variable. Data Types – Declaration and initialization of variables, typedef, typecasting. Expressions and Type of operators. Precedence and order of Evaluation Managing Input and Output Operations – Unformatted, Formatted I/O operations- printf and scanf, escape sequence characters. Control Statements: Sequence, Decision Making and Branching – simple if, if-else, nested if – if ladder and elseif ladder, switch- case, Looping Statements – while, for, do-while, jumping statements- break, continue, exit, goto-labels. Solving Simple Scientific and Statistical Problems.	

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	Arrays and Strings	Hours 13
Unit 3	Arrays: Initialization, Declaration, One Dimensional and Two-Dimensional Arrays. Searching: linear and binary searching, Sorting: selection and bubble sorting techniques. Matrix operations- addition and multiplication of two matrices. String: Declaration and initialization, String handling functions, character handling functions, Command Line Arguments.	
	Functions and Pointers	Hours 10
Unit 4	Function: User defined and Library functions, Basics of functions, Definition of Function, Declaration of Function, Types of user defined functions, Pass by Value, Pass by Reference, Return values, Recursion. Pointers: Definition, Initialization, Pointers Arithmetic, Pointers and Arrays, Example Problems.	
	Structures and Unions	Hours 10
Unit 5	Introduction, Need for Structure Data Type, Structure Definition, Structure Declaration, Structure within a Structure, Union, Programs Using Structures and Unions, Storage Classes, Pre-processor Directives.	

TEXT BOOKS:

1. E. Balaguruswamy: Programming in ANSI C (TMH)
2. Computer Fundamentals and Programming in C, by Anjay Mittal & Anita-Goel, Pearson

REFERENCE BOOKS:

1. P. K. Sinha & Priti Sinha: Computer Fundamentals (BPB)
2. Kamthane: Programming with ANSI and TURBO C (Pearson Education)
3. V. Rajaraman: Programming in C (PHI – EEE)
4. S. Byron Gottfried: Programming with C (TMH)
5. Yashwant Kanitkar: Let us C
6. P.B. Kottur: Programming in C (Sapna Book House)

First Semester			
Subject Name: Programming in C Lab			
Subject Code	BSCP 102	CIE Marks	10
No of Hours/Week:	4	SEE Marks	40
Total Hours:	60	Credits	2

LIST OF PRACTICAL PROGRAMS**INSTRUCTIONS:**

- Every student should identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.
- The following activities be carried out/ discussed in the lab during the initial period of the semester.
- Familiarization of Basic Software – Operating System, DOS Commands Word Processors, Internet Browsers, Integrated Development Environment (IDE) with Examples.
- Type Program Code, Debug and Compile basic programs covering Programming in C fundamentals discussed during theory classes.
- Do's and Don'ts, Safety Guidelines in Computer Lab

PART A:

1. Convert the temperature given in Fahrenheit to Celsius
2. An object undergoes uniformly accelerated motion. The initial velocity (u) of the object and the acceleration (a) are known. Write a C program to find the velocity (v) of the object after time t
3. Write a C program to Find one's and two's complement of a number
4. Write a C program to multiply a given number with 2n, without using a multiplication operator.
5. The value of n will be entered by the user
6. Write a C program to check whether a given number is perfect or not.
7. Write a C program to Print Floyd's triangle
8. Write a C program to check whether a given number is even or odd without /with using modulus operator
9. Write a C program to calculate the roots of a quadratic equation
10. Making use of sine series, evaluate the value of $\sin(x)$, where x is in radians
11. Write a C program to Find arithmetic mean, variance and standard deviation of n elements
12. Write a C program to find a given value called Key in a list of N numbers using binary search

PART B:

1. Write a C program that sorts the list in ascending order by using bubble sort.
2. Given two sorted one-dimensional arrays A and B of size m and n, respectively. Write a C program to merge them into a single-sorted array C that contains every element from arrays A and B in ascending order
3. Write a C program to Add and Multiply two matrices of order $m \times n$
4. Write a C program to find the sum of the rows and columns of a matrix.
5. Write a C program to check whether a given square matrix is symmetric or not.

6. A class consists of a number of students whose names are entered in a random order. Write a C program to display the names of all the students that start with a particular character
7. Write a C program to Input a string and count the occurrences of vowels in the particular string in the string
8. Write a C program that illustrates pass by reference and pass by value
9. Write a C program that makes the use of a recursive function to find the factorial of a number.
10. Write a C function that Illustrate the use of built in mathematical function.
11. Write a C program that illustrates the use of structure and union
12. Write a C program that illustrates to Pre-processor Directives

Second Semester			
Subject Name: Data Structure and Operating Systems			
Subject Code	BSCT 201	CIE Marks	20
No of Hours/Week:	4	SEE Marks	80
Total Hours:	60	Credits	4

COURSE OBJECTIVES:

1. To explore and understand the concepts of Data Structures and its significance in programming.
2. Understand the commonly used data structures and various forms of its implementation for different applications using C
3. To improve the logical ability.
4. Outline various concepts and features of Operating systems.
5. To explain main components, policies of OS and their working

COURSE OUTCOMES:

At the end of the course students will be able to:

1. Learn about Data structures, its types and significance in computing.
2. Student will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
3. Explore about Abstract Data types and its implementation
4. Ability to program various applications using different data structure in C
5. Implement algorithm of CPU Scheduling, Memory Scheduling and disk scheduling.

Unit 1	Data Structure and Linked List	Hours 12
	Data structure – Definition, Abstract data type, Classification of Data Structures, Operations on Data Structures-primitive and non-primitive. Memory management functions- malloc, calloc, realloc and free. Linked list: Definition, Memory representation of Singly linked list, Types-SLL, DLL and CLL. Operations- create, display, insert and delete. Garbage collection	
Unit 2	Stacks and Queues	Hours 15
	Stacks: Definition, Array representation of stacks, Linked representation of stacks, Operations on stack. Expressions: Polish Notation, Application of Stacks. Algorithm – Convert infix to postfix expression and evaluate postfix expression. Queues – Definition, Array representation of queue, Linked list representation of queues. Types of queues: Simple queue, Circular queue, Double ended queue, Priority queue, Operations on Queues, Applications of queues	
Unit 3	Tree and Graph	Hours 10
	Tree – Definitions, Types of trees, memory representation of binary tree, tree traversing techniques, Binary Search Trees- definition and construction of binary search tree. Graphs: Graph theory terminology: pendent vertex, isolated vertex, degree of vertex, path, walk, self-loop, cycle, Representation of Graphs.	

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	Introduction to Operating System, Process and Memory Management	Hours 13
Unit 4	<p>Basics of operating systems: Introduction to operating system, Generations, Types, Structure, Services, System Calls, System Boot, System Programs, Protection and Security.</p> <p>Process and Memory management: Process Concepts, Process States, Process Control Block, Scheduling-Criteria, Scheduling Algorithms and their Evaluation, Threads, Process synchronization and Deadlock.</p> <p>Memory management: Main Memory, Swapping, Contiguous Memory Allocation, Paging, Structure of Page Table, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.</p>	
	Storage and File Management	Hours 10
Unit 5	<p>Storage and File management: Mass-Storage Structure, Disk Structure, Disk Scheduling,</p> <p>File system interface: File Concept, Access Methods, Directory Structure, File System Structure, Allocation Methods and Free-Space Management.</p> <p>Unix Operating System: Brief history of UNIX, strengths and weaknesses of UNIX, basic commands of Unix operating system. Introduction to Shell Scripting</p>	

TEXT BOOKS:

1. Data Structure using C by Reema Thereja, Oxford University Press.
2. Data Structure by S. Lipschutz - (Schaum Series)
3. Operating System Concepts, Silberschatz, Ninth Edition, Willey Publication.
4. Das S. : Your UNIX – The Ultimate Guide, Tata McGraw-Hill, 2001

REFERENCE BOOKS:

1. Introduction to Data Structure in C by: Angkatan; Pearson Education
2. Alfred V Aho, John E Hopcroft and Jeffery D Ullman, “Data Structures and Algorithms”, Pearson Education.
3. Modern Operating Systems, Tanenbaum, Fourth Edition. Pearson Publication.

Second Semester			
Subject Name: Data Structure and Linux Lab			
Subject Code	BSCP 202	CIE Marks	10
No of Hours/Week:	4	SEE Marks	40
Total Hours:	60	Credits	2

LIST OF PRACTICAL PROGRAMS

PART A: (Data Structure)

1. Write a program to demonstrate binary search.
2. Write a program to demonstrate selection sort.
3. Write a program to demonstrate insertion sort.
4. Write a program to demonstrate merge sort.
5. Write a program to find first and second largest element using dynamic array.
6. Write a program to perform all operations on stack using array.
7. Write a program to perform all operations on queue using arrays.
8. Write a program to evaluate postfix expression
9. Write a program to evaluate convert infix to postfix expression.
10. Write a program to implement circular queue using array.
11. Write a program to perform all operations on a singly linked list.
12. Write a program to implement stack using linked list.
13. Write a program to implement queue using linked list.
14. Write a program to perform in-order, preorder and post order traversal of a binary tree.

PART B: (Linux)

1. Study of Unix/Linux general purpose utility command list:
 - a. man, who, cat, cd, cp, ps, ls, rm, mkdir, rmdir, mv, echo, more, date, time, kill,
 - b. history, pwd, cal, logout, shutdown
2. Write shell script to print your name by taking input from key board.
3. Write shell script to perform arithmetic operations
4. Write a Shell Program to check whether a given year is leap year or not.
5. Write shell script in Linux to perform linear search
6. Write a shell program to find the factorial of a given number.
7. Write a shell script to count lines, words and characters in its input
8. Write a shell program to find the given number is palindrome or not

**Question Paper Pattern for Semester End Examination (SEE)
(Common for I and II Semester)
SUBJECT NAME**

Time: 3 Hrs.

Max. Marks: 80

Instruction to Candidate: Answer all the Sections

SECTION A

I. Answer any ten of the following questions (10X2 = 20)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

SECTION B

II. Answer any five of the following questions (5X5 = 25)

- 13.
- 14.
- 15.
- 16.
- 17.
- 18.
- 19.

SECTION C

III. Answer any five of the following questions (5X7 = 35)

- 20.
- 21.
- 22.
- 23.
- 24.
- 25.
- 26.