Computer Science Paper I
Advanced 'C'
[CORE COURSE]

Semester – II	Credits: 2	Subject Code: BS22001	Lectures: 40

Course Outcomes:

At the end of this course, the learner will be able to:
- Construct the code organization with complex data types, structures and preprocessor directives.
- Write programming code for files manipulation.
- Recognize the advanced concepts of programming using the 'C' language.

Unit 1: Arrays and Pointers	**14**
• **Chapter 1: Arrays** ○ Array declaration, initialization ○ Types – one, two and multidimensional ○ Array Operations - declaration, initialization, accessing array elements. ○ Memory representation of two-dimensional array (row and column major) ○ Passing arrays to function. ○ Array applications - Finding maximum and minimum (using brute force method), Counting occurrences, Linear search, ○ Sorting an array (Simple exchange sort, bubble sort), Merging two sorted arrays, Matrix operations (trace of matrix, addition transpose, multiplication, symmetric, upper/ lower triangular matrix)	6
• **Chapter 2 : Pointers** ○ Pointer declaration, initialization ○ Dereferencing pointers ○ Pointer arithmetic ○ Pointers to array ○ Functions and pointers-passing pointers to functions(call by reference), function returning pointers ○ Dynamic memory allocation ○ Pointer to pointer	8

Unit 2: Strings	**8**
• **Chapter 3: Strings** ○ Declaration and initialization. Format specifiers ○ Standard library functions ○ Strings pointers ○ Array of strings ○ Command line arguments	8

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Unit 3: Structures and Unions	8

• **Chapter 4: Structures and Unions**
  o Creating structures
  o Accessing structure members (dot Operator)
  o Structure initialization
  o Array of structures
  o Passing structures to functions
  o Nested structures
  o Pointers and structures
  o Unions
  o Difference between structures and unions
  o To implement function using structure, pointer and structure
	8

Unit 4: Files and Preprocessor	10

• **Chapter 5: File Handling**
  o Introduction to Streams
  o Types of Files
  o Operations on files
  o Standard library input/output functions.
  o Random access to files.
	8

• **Chapter 6 : C Preprocessor**
  o Format of Preprocessor directive
  o File Inclusion directive and conditional directives
  o Macro substitution, nested macro, argumented macro
  o Macros versus functions
	2

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Recommended Books:

- Ajay Mitta,*Programming in C ,A Practical Approach*, 1 , Pearson
- Behrouz A. Forouzan, Richard F. Gilberg, *A Structured Programming Approach Using C*,Cengage Learning India
- Brian Kernighan, Dennis Ritchie ,*The 'C' programming language*, PHI
- B. Gottfried , *Programming with C*, , 3rd edition, Schaum's outline Series, Tata McGraw Hill.
- E. Balagurusam, *Programming in ANSI C*, 7th Edition, McGraw Hill.
- Schildt Herbert ,*C: the Complete Reference*, 4th edition, McGraw Hill.

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