

COMPUTER SCIENCE AND ENGINEERING

I Semester: CSE/IT/ECE/EEE II Semester: AE/CE/ME								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
ACS001	Foundation	L	T	P	C	CIA	SEE	Total
		3	1	3	4	30	70	100
Contact Classes: 45		Tutorial Classes: 15		Practical Classes: Nil			Total Classes: 60	
<p>OBJECTIVES:</p> <p>The course should enable the students to:</p> <ol style="list-style-type: none"> I. Learn adequate knowledge by problem solving techniques. II. Understand programming skills using the fundamentals and basics of C Language. III. Improve problem solving skills using arrays, strings, and functions. IV. Understand the dynamics of memory by pointers. V. Study files creation process with access permissions <p>COURSE LEARNING OUTCOMES (CLOs):</p> <ol style="list-style-type: none"> 1. Identify and understand the working of key components of a computer system. 2. Analyze a given problem and develop an algorithm to solve the problem. 3. Describe the fundamental programming constructs and articulate how they are used to develop a program with a desired runtime execution flow. 4. Gain knowledge to identify appropriate C language constructs to write basic programs. 5. Identify the right data representation formats based on the requirements of the problem. 6. Describe the operators their precedence and associativity while evaluating expressions in program statements. 7. Understand branching statements, loop statements and use them in problem solving. 8. Learn homogenous derived data types and use them to solve statistical problems. 9. Understand procedural oriented programming using functions. 10. Understand how recursion works and write programs using recursion to solve problems 11. Differentiate call by value and call by reference parameter passing mechanisms. 12. Understand pointers conceptually and apply them in C programs. 13. Distinguish homogenous and heterogeneous data types and apply them in solving data processing applications. 14. Explain the concept of file system for handling data storage and apply it for solving problems. 15. Differentiate text files and binary files and write the simple C programs using file handling functions. Searching, Sorting. 16. Apply the concepts to solve real-time applications using the features of C language 17. Possess the knowledge and skills for employability and to succeed in national and international level competitive examinations. 								
Unit-I	INTRODUCTION TO DATA STRUCTURES, SEARCHING AND SORTING						Classes: 11	
Introduction to computers: Computer systems, computing environments, computer languages, creating and running programs, algorithms, flowcharts; Introduction to C language: History of C, basic structure of C programs, process of compiling and running a C program, C tokens, keywords, identifiers, constants, strings, special symbols, variables, data types; Operators and expressions: Operators, arithmetic, relational and logical, assignment operators, increment and decrement operators, bitwise and conditional operators, special operators, operator precedence and associativity, evaluation of expressions, type conversions in expressions, formatted input and output.								

Unit -II	LINEAR DATA STRUCTURES	Classes: 09
Control structures: Decision statements; if and switch statement; Loop control statements: while, for and do while loops, jump statements, break, continue, goto statements; Arrays: Concepts, one dimensional arrays, declaration and initialization of one dimensional arrays, two dimensional arrays, initialization and accessing, multi dimensional arrays; Strings concepts: String handling functions, array of strings.		
Unit -III	LINKED LISTS	Classes: 10
Functions: Need for user defined functions, function declaration, function prototype, category of functions, inter function communication, function calls, parameter passing mechanisms, recursion, passing arrays to functions, passing strings to functions, storage classes, preprocessor directives. Pointers: Pointer basics, pointer arithmetic, pointers to pointers, generic pointers, array of pointers, pointers and arrays, pointers as functions arguments, functions returning pointers.		
Unit -IV	NON LINEAR DATA STRUCTURES	Classes: 09
Structures and unions: Structure definition, initialization, accessing structures, nested structures, arrays of structures, structures and functions, passing structures through pointers, self referential structures, unions, bit fields, typedef, enumerations; Dynamic memory allocation: Basic concepts, library functions.		
Unit -V	BINARY TREES AND HASHING	Classes: 09
Files: Streams, basic file operations, file types, file opening modes, file input and output functions, file status functions, file positioning functions, command line arguments.		
Text Books:		
<ol style="list-style-type: none"> 1. Stephen G. Kochan, "Programming in C", Addison-Wesley Professional, 4th Edition, 2014. 2. B. A. Forouzan, R. F. Gillberg, "C Programming and Data Structures", Cengage Learning, India, 3rd Edition, 2014. 		
Reference Books:		
<ol style="list-style-type: none"> 1. W. Kernighan Brian, Dennis M. Ritchie, "The C Programming Language", PHI Learning, 2nd Edition, 1988. 2. Yashavant Kanetkar, "Exploring C", BPB Publishers, 2nd Edition, 2003. 3. E. Balagurusamy, "Programming in ANSI C", Mc Graw Hill Education, 6th Edition, 2012. 4. Schildt Herbert, "C: The Complete Reference", Tata Mc Graw Hill Education, 4th Edition, 2014. 5. R. S. Bichkar, "Programming with C", Universities Press, 2nd Edition, 2012. 6. Dey Pradeep, Manas Ghosh, "Computer Fundamentals and Programming in C", Oxford University Press, 2nd Edition, 2006. 		