Subject Code: TCS201 Course Title: Programming for Problem solving

Semester: II

Pre-requisite: Basic Knowledge of Mathematics and Computer Fundamentals

Course Outcomes: After completion of the course students will be able to

1. Learn and apply concepts of strings for providing solutions to homogenous collection of data types
2. Propose solution to problem by using tools like algorithm and flowcharts.
3. Apply the concept of pointers to optimize memory management by overcoming the limitations of arrays.
4. Process and analyze problems based on heterogeneous collection of data using structures.
5. Apply concepts of file handling to implement data storage and retrieval tasks.
6. Implement the basic real life problems using python.

Detailed Syllabus

Unit – I	**Arrays** –Single and Multi-dimensional arrays, Initializing arrays, computing address of an element in array, row major and column major form of an array, character strings and arrays, segmentation fault, bound checking, Sorting Algorithms – Bubble sort, insertion sort, selection sort.	**10**
	Strings – Declaration of strings, Initialization of strings using arrays and pointers, Standard library functions of <string.h>header file, Null-terminated strings, Char arrays and pointers, Pointers and Strings, comparing two strings, find substring in a string, tokenizing a string with strtok() function, pointer-based string-conversion function – atoi()	**6**
Unit – II	**Pointers** –Basic of pointers and addresses, Pointers and arrays, Pointer arithmetic, passing pointers to functions, call by reference, Dynamic memory management in C - malloc(), calloc(), realloc(), free(), memory leak, Dangling, Void, Null and Wild pointers **Structures -** Structures, array of structures, structure within structure, union, typedef, self-referential structure, pointer to structure.	**10**

Unit – III	**File Handling -** Opening or creating a file, closing a file, File modes, Reading and writing a text file using getc(), putc(), fprintf() ,fscanf(),fgets(), fputs(), Difference between append and write mode, Reading and writing in a binary file, counting lines in a text file, Search in a text file, Random file accessing methods- feof(), fseek(), ftell() and rewind() functions,	**8**
Unit – IV	**Introduction to Python-** History of Python, Need of Python Programming, Python features, Installation of Python in Windows and Linux, First Python Program, Running python Scripts, Variables, Reserved words, Lines and indentation, Quotations, Comments, Input output. Data Types, Operators and Expressions: Standard Data Types – Numbers, strings, Boolean, Operators – Arithmetic Operators, comparison Operators, assignment Operators, logical Operators, Bitwise Operators.	**10**
Unit-V	**Control flow –** if, if-elif-else, for, while, break, continue, pass, range(), nested loops, Data structures – List, Tuple, Dictionary File Handling – Reading text file, writing text file, copying one file to another	**10**

Text Books:

- Peter Prinz, Tony Crawford,"C in a Nutshell", 1stEdition, Oreilly Publishers, 2011
- YashwantKanetkar,"Let Us C",8th Edition,BPB Publication 2007

Reference Books:

- Steve Oualline, "Practical C programming", 3rdEdition, Orielly Publishers, 2011
- Brian W Kernighan, Dennis M Ritcie,"The C Programming Language", 2ndEdition, Prentice Hall, 1988.
- Herbert Schildt," C: The Complete Reference", 4thEdition.TMH, 2000
- E.Balagurusamy,"Programming in ANSI C",6th Edition, McGraw Hill 2015