PROGRAMMING FOR PROBLEM SOLVING

I B. TECH- II SEMESTER								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
A4CS01	**ESC**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	-	-	3	30	70	100

COURSE OBJECTIVES
1. To impart basic knowledge about simple algorithms for arithmetic and logical problems.
2. To understand how to write a program, syntax and logical errors.
3. To enable them how to implement conditional branching, iteration and recursion.
4. To understand how to decompose a problem into functions and synthesize a complete program.
5. To enable them to use arrays, pointers, strings and structures in solving problems.
6. To understand how to solve problems related to matrices, Searching and sorting.
7. To make them to understand the use files to perform read and write operations.

COURSE OUTCOMES
At the end of the course, student will be able to:
1. Formulate simple algorithms for arithmetic and logical problems.
2. Test and execute the programs and correct syntax and logical errors.
3. Implement conditional branching, iteration and recursion.
4. Decompose a problem into functions and synthesize a complete program.
5. Use arrays, pointers, strings and structures to formulate algorithms and programs.
6. Apply programming to solve problems related to matrices, Searching and sorting.
7. Use files to perform read and write operations.

UNIT-I	**INTRODUCTION**	**CLASSES: 12**

Introduction to Programming: Computer system, components of a computer system, 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, I/O statements.

UNIT-II	**OPERATORS, EXPRESSIONS AND CONTROL STRUCTURES**	**CLASSES: 15**

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.
Control structures: Decision statements; if and switch statement; Loop control statements: while, for and do while loops, jump statements, break, continue, goto statements.

UNIT-III	**ARRAYS AND FUNCTIONS**	**CLASSES: 17**

Arrays: Concepts, One dimensional array, declaration and initialization of one dimensional arrays, two dimensional arrays, initialization and accessing, multi dimensional arrays, Basic Algorithms: Searching, Basic Sorting Algorithms- Bubble sort, Insertion sort and Selection sort.
Functions: User defined and built-in Functions, storage classes, Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference, Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc, Quick sort or Merge sort.

UNIT-IV	**STRINGS AND POINTERS**	**CLASSES: 10**

Strings: Arrays of characters, variable length character strings, inputting character strings, character library functions, string handling functions.
Pointers: Pointer basics, pointer arithmetic, pointers to pointers, generic pointers, array of pointers, functions returning pointers, Dynamic memory allocation.

UNIT-V	**STRUCTURES AND FILE HANDLING**	**CLASSES: 10**

Structures and unions: Structure definition, initialization, accessing structures, nested structures, arrays of structures, structures and functions, self referential structures, unions, typedef, enumerations.
File handling: command line arguments, File modes, basic file operations read, write and append,

example programs

TEXT BOOKS:

1. Byron Gottfried, "Programming with C", Schaum's Outlines Series, McGraw Hill Education, 3rd edition, 2017.
2. E. Balagurusamy, "Programming in ANSI C", McGraw Hill Education, 6th Edition, 2012.

REFERENCE BOOKS:

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. Schildt Herbert, "C: The Complete Reference", Tata McGraw Hill Education, 4th Edition, 2014.
4. R. S. Bichkar, "Programming with C", Universities Press, 2nd Edition, 2012.
5. Dey Pradeep, Manas Ghosh, "Computer Fundamentals and Programming in C", Oxford University Press, 2nd Edition, 2006.
6. Stephen G. Kochan, "Programming in C", Addison-Wesley Professional, 4th Edition, 2014.
7. B. A. Forouzan, R. F. Gillberg, "C Programming and Data Structures", Cengage Learning, India, 3rd Edition, 2014.

WEB REFERENCES:

1. https://www.bfoit.org/itp/Programming.html
2. https://www.khanacademy.org/computing/computer-programming
3. https://www.edx.org/course/programming-basics-iitbombayx-cs101-1x-0
4. https://www.edx.org/course/introduction-computer-science-harvardx-cs50x

E-TEXT BOOKS:

1. http://www.freebookcentre.net/Language/Free-C-Programming-Books-Download.htm
2. http://www.imada.sdu.dk/~svalle/courses/dm14-2005/mirror/c/
3. http://www.enggnotebook.weebly.com/uploads/2/2/7/1/22718186/ge6151-notes.pdf

MOOC COURSE

1. https://onlinecourses.nptel.ac.in/noc18_cs33/preview
2. https://www.alison.com/courses/Introduction-to-Programming-in-c
3. http://www.ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-s096-effective-programming-in-c-and-c-january-iap-2014/index.htm