

Maulana Abul Kalam Azad University of Technology, West Bengal
(Formerly West Bengal University of Technology)
1st Year Curriculum Structure for B.Tech courses in Engineering & Technology
(Applicable from the academic session 2018-2019)

Course Code : ES-CS201	Category : Engineering Science Courses
Course Title : Programming for Problem Solving	Semester : Second
L-T-P : 3-0-0	Credit:3
Pre-Requisites:	

Detailed contents

Unit 1: Introduction to Programming (4 lectures)

- Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) - **(1 lecture)**.
- Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. **(1 lecture)**
- From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code- **(2 lectures)**

Unit 2: Arithmetic expressions and precedence (2 lectures)

Unit 3: Conditional Branching and Loops (6 lectures)

- Writing and evaluation of conditionals and consequent branching **(3 lectures)**
- Iteration and loops **(3 lectures)**

Unit 4: Arrays (6 lectures)

- Arrays (1-D, 2-D), Character arrays and Strings

Unit 5: Basic Algorithms (6 lectures)

- Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

Unit 6: Function (5 lectures)

- Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference

Unit 7: Recursion (4 -5 lectures)

- 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 8: Structure (4 lectures)

- Structures, Defining structures and Array of Structures

Unit 9: Pointers (2 lectures)

- Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Unit 10: File handling (only if time is available, otherwise should be done as part of the lab)

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Course Outcomes

The student will learn

- To formulate simple algorithms for arithmetic and logical problems.
- To translate the algorithms to programs (in C language).
- To test and execute the programs and correct syntax and logical errors.
- To implement conditional branching, iteration and recursion.
- To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
- To use arrays, pointers and structures to formulate algorithms and programs.
- To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
- To apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.

Learning Resources:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
4. R. S. Salaria, Computer Concepts and Programming in C, Khanna Publishers