PROBLEM SOLVING THROUGH PROGRAMMING IN C

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INTENDED AUDIENCE : BE/BTech in all disciplines BCA/MCA/M. Sc

INDUSTRIES APPLICABLE TO : All IT Industries

COURSE OUTLINE : This course is aimed at enabling the students to

- Formulate simple algorithms for arithmetic and logical problems
- Translate the algorithms to programs (in C language)
- Test and execute the programs and correct syntax and logical errors
- Implement conditional branching, iteration and recursion
- Decompose a problem into functions and synthesize a complete program using divide and conquer approach
- Use arrays, pointers and structures to formulate algorithms and programs
- Apply programming to solve matrix addition and multiplication problems and searching and sorting problems
- Apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration

ABOUT INSTRUCTOR :

Prof. Anupam Basu is Professor in the Dept. of Computer Science Engineering, IIT Kharagpur, and has been an active researcher in the areas of Cognitive and Intelligent Systems, Embedded Systems and Language Processing, Presently he is acting as the Chairman and Head of the Center for Educational Technology, IIT Kharagpur. He has developed several embedded system based tools empowering the physically challenged and has led several national projects in the area. He has taught at the University of California, Irvine at the Center for Embedded Systems. He is an Alexander von Humboldt Fellow and a Fellow of the Indian National Academy of Engineering. The awards won by him include the State Award for the Best Contribution to the Cause of Empowerment of the Disabled (2014), Universal Design Award 2011, for contributions in design for the disabled, by National Council for Promotion of Employment of Disabled Persons, India, the National Award for the Best Technology Innovation for the Physically Disabled (2007) and the Da-Vinci Award 2004 from the Engineering Society of Detroit.

COURSE PLAN :

Week 1**:** Introduction to Problem Solving through programs, Flowcharts/Pseudo codes, the compilation process, Syntax and Semantic errors, Variables and Data Types

Week 2**:** Arithmetic expressions, Relational Operations, Logical expressions; Introduction to Conditional Branching

Week 3**:** Conditional Branching and Iterative Loops

Week 4**:** Arranging things : Arrays

Week 5**:** 2-D arrays, Character Arrays and Strings

Week 6**:** Basic Algorithms including Numerical Algorithms

Week 7**:** Functions and Parameter Passing by Value

Week 8**:** Passing Arrays to Functions, Call by Reference

Week 9**:** Recursion

Week 10**:** Structures and Pointers

Week 11**:** Self-Referential Structures and Introduction to Lists

Week 12**:** Advanced Topics