Course Code	Course Title	L	T	P	C
BSTS301P	Advanced Competitive Coding – I	0	0	3	1.5
Pre-requisite	NIL	Syllabus version			
		1.0			

Course Objectives

1. To develop the step by step approach in solving problems with the help programming techniques of data structures.
2. To deploy algorithms in real time applications.

Course Outcomes

At the end of the course the student should be able to

1. Provide a basic understanding of core Java concepts
2. Identify Bitwise algorithms for solving real world problems.
3. Illustrate various techniques for searching, sorting and hashing
4. Understand and implement Greedy Algorithm.

Module:1	**Algorithms**	**6 hours**
Java Introduction, Features, Structure, Data Types, Basic I/O Operators, Decision making and Control structure, Time & Space complexity.		
Module:2	**Math based problems**	**6 hours**
Simple Sieve, Segmented & Incremental Sieve, Euler's phi Algorithm, Strobogrammatic Number, Remainder Theorem, Toggle the switch & Alice Apple tree, Binary Palindrome.		
Module:3	**Bitwise algorithms**	**6 hours**
Booth's Algorithm, Euclid's Algorithm, Karatsuba Algorithm, Longest Sequence of 1 after flipping a bit Swap two nibbles in a byte		
Module:4	**Arrays and Searching**	**6 hours**
Block Swap Algorithm, Max product subarray, Maximum sum of hour glass in matrix, Max Equilibrium Sum, Leaders in array, Majority element.		
Module:5	**Sorting and String**	**6 hours**
Lexicographically first palindromic string, Natural Sort order , Weightes substring ,Move hyphen to beginning, Manacher's Algorithm		
Module:6	**Recursion and Back tracking**	**6 hours**
Sorted Unique Permutation, Maneuvering, Combination, Josephus trap, Maze Solving, N Queens Problem.		
Module:7	**Greedy Algorithm:**	**6 hours**
Warnsdorff's Algorithm, Hamiltonian Cycle, Kruskal's Algorithm ,Activity Selection Problem, Graph Coloring, Huffman Coding		
Module:8	**Interview Preparation**	**3 hours**
Networking , Security, Cryption Techniques		
Total Lecture hours:		**45 hours**

Text Book

1.	Mark Allen Weiss, "Data structures and algorithm analysis in C++", 2019, 4th Edition, Pearson Education.

Reference Books

1.	J.P. Tremblay and P.G. Sorenson, "An Introduction to Data Structures with applications", 2017, Second Edition, Tata Mc Graw Hill.
2.	Richard M. Reese, Jennifer L. Reese, Alexey Grigorev , Java: Data Science Made Easy,2019, Pocket Publishing.

Mode of Evaluation: Written assignment, Quiz, Project & FAT.			
Recommended by Board of Studies	24-02-2023		
Approved by Academic Council	No. 69	Date	16-03-2023