CSE563:APPLIED MATHEMATICS

Course Outcomes: Through this course students should be able to

CO1 :: describe the concepts of analytical math in computer science and engineering

CO2 :: discuss the problems of probability and able to solve them

CO3 :: use graph theory concepts in solving practical problems

CO4 :: analyze different mathematical problems to achieve new algorithmic designs.

CO5 :: recommend the type of graphs and trees to solve the mathematical problems

CO6 :: develop translate real-world problems into probabilistic models.

Unit I

Basic mathematics in computer science : number theory, set theory, boolean algebra, logic and calculus, mathematical induction, functions and relations

Unit II

Vectors and matrices : vector and operations, matrices and operations, principle component analysis, linear discriminant analysis, image transformation, image interpolation

Unit III

Probability and statistics : basic probability, compound probability, probability distribution, frequentist inference, bayesian inference, regression analysis

Unit IV

Graph theory : graph basics, graph types, graph searching algorithms, graph traversing algorithms, graph coloring problem, max-flow min-cut algorithm

Unit V

Algorithm complexity analysis : asymptotic notations, recurrence relations, master theorem, P-NP complete problems, satisfiability problem, searching and sorting problem

Unit VI

Algorithmic and optimization approach : greedy approach, dynamic programming, divide and conquer, back tracking, genetic algorithm, nature inspired algorithm and approaches

Text Books:

1. DISCRETE MATHEMATICS by SEYMOUR LIPSCHUTZ, MARK LIPSON, MCGRAW HILL EDUCATION

References:

1. GRAPH THEORY WITH APPLICATIONS TO ENGINEERING AND COMPUTER SCIENCE by NARSINGH DEO, PHI Learning

2. INTRODUCTION TO ALGORITHMS by THOMAS H CORMEN, CHARLES E. LEISERSON, RONALD L. RIVEST AND CLIFFORD STEIN, PHI Learning