Sampling. Sampling distributions, standard error, test of hypothesis for means, confidence limits for means, student's t-distribution. Chi -Square distribution as a test of goodness of fit

[6 hours]

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Latest edition, Khanna Publishers
2. Erwin Kreyszig, Advanced Engineering Mathematics, Latest edition, Wiley Publications.

Reference Book:

1. B.V. Ramana, Higher Engineering Mathematics, Latest edition, Tata Mc. Graw Hill Publications.
2. Peter V. O'Neil, Engineering Mathematics, CENGAGE Learning India Pvt Ltd.Publishers

GRAPH THEORY AND COMBINATORICS
(Common to CSE & ISE)

Subject Code: 10CS42	I.A. Marks : 25
Hours/Week : 04	Exam Hours: 03
Total Hours : 52	Exam Marks: 100

PART – A
UNIT - 1   **7 Hours**
Introduction to Graph Theory: Definitions and Examples, Subgraphs, Complements, and Graph Isomorphism, Vertex Degree, Euler Trails and Circuits

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UNIT – 2   **6 Hours**
Introduction to Graph Theory *contd.*: Planar Graphs, Hamilton Paths and Cycles, Graph Colouring, and Chromatic Polynomials

UNIT - 3   **6 Hours**
Trees: Definitions, Properties, and Examples, Routed Trees, Trees and Sorting, Weighted Trees and Prefix Codes

UNIT - 4   **7 Hours**
Optimization and Matching: Dijkstra's Shortest Path Algorithm, Minimal Spanning Trees – The algorithms of Kruskal and Prim, Transport Networks – Max-flow, Min-cut Theorem, Matching Theory

PART – B
UNIT - 5   **6 Hours**
Fundamental Principles of Counting: The Rules of Sum and Product, Permutations, Combinations – The Binomial Theorem, Combinations with Repetition, The Catalon Numbers

UNIT - 6   **6 Hours**
The Principle of Inclusion and Exclusion: The Principle of Inclusion and Exclusion, Generalizations of the Principle, Derangements – Nothing is in its Right Place, Rook Polynomials

UNIT - 7   **7 Hours**
Generating Functions: Introductory Examples, Definition and Examples – Calculational Techniques, Partitions of Integers, the Exponential Generating Function, the Summation Operator

UNIT - 8   **7 Hours**
Recurrence Relations: First Order Linear Recurrence Relation, The Second Order Linear Homogeneous Recurrence Relation with Constant Coefficients, The Non-homogeneous Recurrence Relation, The Method of Generating Functions

Text Book:
   1. Ralph P. Grimaldi: Discrete and Combinatorial Mathematics, 5ᵗʰ Edition, Pearson Education, 2004.
      (Chapter 11, Chapter 12.1 to 12.4, Chapter 13, Chapter 1, Chapter 8.1 to 8.4, Chapter 9 Chapter 10.1 to 10.4).

Reference Books:

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1. D.S. Chandrasekharaiah: Graph Theory and Combinatorics, Prism, 2005.
2. Chartrand Zhang: Introduction to Graph Theory, TMH, 2006.
3. Richard A. Brualdi: Introductory Combinatorics, 4th Edition, Pearson Education, 2004.
4. Geir Agnarsson & Raymond Geenlaw: Graph Theory, Pearson Education, 2007.

DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSE & ISE)

Subject Code: 10CS43   I.A. Marks   : 25
Hours/Week : 04   Exam Hours: 03
Total Hours : 52   Exam Marks: 100

PART – A

UNIT – 1   **7 Hours**
INTRODUCTION: Notion of Algorithm, Review of Asymptotic Notations, Mathematical Analysis of Non-Recursive and Recursive Algorithms
Brute Force Approaches: Introduction, Selection Sort and Bubble Sort, Sequential Search and Brute Force String Matching.

UNIT - 2   **6 Hours**
DIVIDE AND CONQUER: Divide and Conquer: General Method, Defective Chess Board, Binary Search, Merge Sort, Quick Sort and its performance.

UNIT - 3   **7 Hours**
THE GREEDY METHOD: The General Method, Knapsack Problem, Job Sequencing with Deadlines, Minimum-Cost Spanning Trees: Prim's Algorithm, Kruskal's Algorithm; Single Source Shortest Paths.

UNIT - 4   **6 Hours**
DYNAMIC PROGRAMMING: The General Method, Warshall's Algorithm, Floyd's Algorithm for the All-Pairs Shortest Paths Problem, Single-Source Shortest Paths: General Weights, 0/1 Knapsack, The Traveling Salesperson problem.

PART – B

UNIT - 5   **7 Hours**

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