



SILVER OAK UNIVERSITY

College of Technology

Bachelor of Technology

Information Technology

Course Name: Applied Mathematics – II

Course Code: 1010273104

Semester: 2nd

Prerequisite:

Basic Mathematics

Course Objectives:

1. Cultivate clear thinking and creative problem solving.
2. Thoroughly train in the construction and understanding of mathematical proofs. Exercise common mathematical arguments and proof strategies.
3. To apply graph theory in solving practical problems.
4. Thoroughly prepare for the mathematical aspects of other Computer Engineering courses.

Teaching Scheme:

| Teaching Scheme | | | | |
|-----------------|---|---|---------------|--------|
| L | T | P | Contact Hours | Credit |
| 3 | 2 | 0 | 5 | 5 |

Contents:

| Unit | Topics | Teaching Hours | Weightage% |
|------|---|----------------|------------|
| 1 | Probability: Introduction, Terms and Concepts, Definition of Probability, Theorems on Probability, Conditional Probability, Multiplicative Theorem for Independent Events, Baye's Theorem, Random Variables, Probability Mass Function, Discrete Distribution Function. | 8 | 15 |
| 2 | Test of Hypothesis: Small Sample Tests, Student's t – distribution, t-test: Test of Significance for Single Mean, Difference of Means, Correlation Coefficients, Snedecor's F-test for Ratio of Variances, Chi-square Test. | 6 | 15 |
| 3 | Basic Statistics: Introduction, Measures of Central Tendency, Measures of Dispersion, Moments, Skewness, Kurtosis. Curve Fitting: Introduction, Least Square Method, Fitting of Linear Curves, Fitting of Quadratic Curves, Fitting of Exponential Curves. | 7 | 20 |
| 4 | Correlation and Regression: Introduction, Correlation, Types of Correlations, Methods of Studying Correlation, Karl Pearson's Coefficient of Correlation, | 4 | 10 |

| | | | |
|---|--|----|----|
| | Rank Correlation, Regression, Types of Regression, Lines of Regression, Regression Coefficients. | | |
| 5 | Graph Theory: <ul style="list-style-type: none"> □ Graphs and Graph Models: Graph Terminology and Special Types of Graphs: Simple Graph, Multi Graph, Pseudograph, Simple Directed Graph, Directed Multi Graph, Mixed Graph, Complete Graph, Regular Graph, Bipartite Graph, Complete Bipartite Graph, Subgraph, Graph Isomorphism, Adjacency Matrices, Incidence Matrices □ Connectivity: Paths, Circuits, Connectedness in directed and undirected graph, Shortest Path Problem, Dijkstra's Algorithm, Euler and Hamilton Paths, Planar Graphs, Euler's Formula, Case Study-Web Graph, Google map. □ Trees: Introduction, properties of trees, Binary search tree, decision tree, prefix codes and Huffman coding, cut sets, Spanning Trees and Minimum Spanning Tree, Kruskal's and Prim's Algorithms, Applications of List structures and graphs. | 20 | 40 |

Course Outcomes:

| Sr. No. | CO Statement | Unit |
|---------|---|------|
| CO-1 | To understand the concepts of probability and expectation for getting the spread of the data and distribution of probabilities. | 1 |
| CO-2 | To analyze testing of hypotheses of small samples using sampling theory. | 2 |
| CO-3 | To observe the measures of central theory and find unknown variables using curve fitting. | 3 |
| CO-4 | To apply statistical methods like correlation, regression analysis. | 4 |
| CO-5 | To understand and apply concepts of graph theory in solving real world problems. | 5 |

Teaching & Learning Methodology:

Problem - based learning
 Cooperative - based learning
 Competency - based learning

List of Experiments:

Total Hours: 28

Unit wise/Topic wise Tutorials/Teacher Guided Problem Solving Sets are to be given for Practice and better understanding of Concepts and applications

Books Recommended:

1. D. C. Montgomery and G. C. Runger, Applied Statistics and Probability for Engineers, Wiley.
2. David Liben-Nowell, "Discrete mathematics for computer science", Wiley Publication.
3. Kenneth H. Rosen. "Discrete Mathematics and its Applications", Tata McGraw-Hill.
4. S. Lipschutz and M. L. Lipson, Schaum's Outline of Theory and Problems of Discrete Mathematics, 2nd Ed., Tata McGraw-Hill.

5. S. Ross, A First Course in Probability, Pearson Education India.
6. Tremblay, J.P. & Manohar, Discrete mathematical structures with application to computer science, McGraw Hill.

List of Open-Source Software/learning website:

1. <https://www.edx.org/learn/discrete-mathematics>
2. <https://www.coursera.org/specializations/discrete-mathematics>
3. <https://nptel.ac.in/courses/106/106/106106094/>
4. https://swayam.gov.in/nd1_noc19_cs67/preview

CO-PO-PSO Matrix:

| Co. No. | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO-1 | 2 | 2 | 2 | | | | | | 1 | | | 3 | 3 | 2 |
| CO-2 | 2 | 2 | 1 | | | | | | 1 | | | 2 | 3 | 2 |
| CO-3 | 2 | 2 | 2 | | | | | | 1 | | | 3 | 2 | 2 |
| CO-4 | 2 | 3 | 2 | | | | | | 1 | | | 3 | 3 | 2 |
| CO-5 | 2 | 3 | 2 | 1 | | | | | 1 | | | 3 | 2 | 2 |