

NIRMA UNIVERSITY

Institute of Technology

Bachelor of Technology -Computer Science and Engineering

Semester – IV

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Course Code	2MA402
Course Name	Probability and Statistics

Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. relate the concepts of probability and statistics and their need in engineering
2. apply concepts and methods of probability and statistics in simulation and modeling of various computer science problems
3. perform probabilistic and statistical analysis of data related to computer science research and projects

Syllabus:

Teaching hours:

Unit I

2

The Role of Statistics in Engineering: The Engineering Method and Statistical Thinking, Collecting Engineering Data, Mechanistic and Empirical Models, Probability and Probability Models

Unit II

7

Probability and Probability Distributions: Independence, Bayes Theorem, Discrete & Continuous Random Variables, Probability Mass and Density Functions, Cumulative Distribution Functions, Mean and Variance of a Random Variable, Discrete & Continuous Distributions

Unit III

4

Descriptive Statistics and Point Estimation of Parameters: Numerical Summaries of Data, Frequency Distributions and Histograms, Point Estimation

Unit IV

7

Statistical Intervals for a Single Sample: Confidence Interval on the mean of a Normal Distribution, Confidence Interval on the Variance and Standard Deviation of a Normal Distribution, Large-Sample Confidence Interval for a Population Proportion, Guidelines for Constructing Confidence Intervals, Tolerance and Prediction Intervals

Unit V

6

Hypothesis Testing: Statistical Hypothesis, P-Values in Hypothesis Test, Tests on the Mean of a Normal Distribution, Tests on the Variance and Standard Deviation of a Normal Distribution, Tests on a Population Proportion, Testing for Goodness of Fit

Unit VI

4

Simple & Multiple Linear Regression: Properties of the Least Squares Estimators, Hypothesis Tests in Simple & Multiple Linear Regression, Confidence Intervals, Prediction of New Observations, Correlation

Laboratory Work:

The Practical work will be based on the topics covered in the syllabus using suitable computer based statistical tool. Minimum 10 experiments should be carried out, Applications in the field of Computer engineering and Information Technology is to be covered in each topic.

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Suggested Readings[^]:

1. C.M. Douglas and G.C. Runger, Applied Statistics and Probability for Engineers, Wiley
2. J. Susan Milton and Jesse Arnold, Introduction to Probability and Statistics: Principles and Applications for Engineering and the Computing Sciences, , McGraw Hill Education
3. Timothy C. Urdan, Statistics in Plain English, Routledge
4. Bertsekas, Dimitri and J. Tsitsiklis, Introduction to Probability, Athena Scientific
5. Alvin Drake, Fundamentals of Applied Probability Theory, McGraw-Hill
6. Sheldon Ross, A First Course in Probability, Prentice Hall

L = Lecture, T = Tutorial, P = Practical, C = Credit

[^] this is not an exhaustive list