NIRMA UNIVERSITY
Institute of Technology
Bachelor of Technology
Open Elective (except Dept. of CSE)

L	T	P	C
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Course Code	**2MAOE27**
Course Title	**Applied Statistics**

Course Outcomes (CO):

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 modelling of various engineering problems
3. compute and interpret the results of regression and correlation analysis
4. perform probabilistic and statistical analysis of data related to engineering research projects

Syllabus: Teaching Hours: 30

Unit I **3**

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 **3**

Probability and Random variables: Discrete and continuous random variables, probability mass, probability density and cumulative distribution functions, Binomial, Poisson distribution and Normal distributions

Unit III **6**

Descriptive Statistics and Point estimation: Numerical summaries of data, frequency distributions and histograms, scatter diagrams, Stem ad Lead Diagram, point estimation

Unit IV **6**

Sampling Distributions and Estimation: Confidence interval on the mean of a normal distribution, Confidence interval on the variance and standard deviation of a normal distribution

Unit V **8**

Testing of Hypotheses: Null and alternative hypotheses, the critical and acceptance regions, p-value in hypothesis, tests (t-test and z-test), test on the mean of normal distribution, tests on the variance and standard deviation of a normal distribution

Unit VI **4**

Regression and Correlation: Properties of least squares estimators, hypothesis test in linear regression, correlation

Self-Study:

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

Suggested Readings^:

1. Douglas C M and Runger G C. Applied statistics and probability for Engineers, Wiley
2. Susan J, Milton and Jesse Arnold, Introduction to Probability and Statistics: Principles and Applications for engineering and the Computing Sciences, McGraw Hill Education
3. Bertsekas, Dimitri and Tsitsiklis J, Introduction to Probability, Athena Scientific
4. Sheldon Ross, A first Course in Probability, Prentice Hall
5. Alvine Drake, Fundamentals of Applied Probability Theory, McGraw-Hill

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

^ this is not an exhaustive list