STATISTICS FOR ENGINEERS

Course Code	18ME564	Credits	03
Course type	PE	CIE Marks	50
Hours/week: L-T-P	3-0-0	SEE Marks	50
Total Hours:	40	SEE Duration	3 Hours for 100 marks

Course objectives

1. To enable students to understand and interpret the system of equations and various solutions, central tendency and dispersion of data.
2. To provide knowledge of curve fitting and Probability concepts
3. To understand the concept of random variables, PDF, CDF and Probability distributions.
4. To impart the knowledge of Sampling distribution and Testing of Hypothesis.
5. To broaden understandings of Joint Probability Distribution and Stochastic processes.

Pre-requisites :Nil

Unit - I   08Hours

Introduction:
Modern Statistics, Statistics and Engineering, The role of Scientists and Engineers in Quality Improvement.
Treatment of Data: Pareto diagrams and Dot Diagrams, Frequency Distributions, Graphs of frequency distributions, stem and leaf displays, Descriptive measures, Quartiles and other percentiles. The calculation of $\bar{X}$ and s.

Self learning topics: Graphs using MS Excel

Unit - II   08Hours

Principles of Counting:
Introduction, Basic counting principles, factorial notation, binomial, coefficients, permutations, combinations, tree diagram.

Unit - III   08Hours

Set theory: Introduction, sets and elements, subsets, Venn diagram, set operations, finite and countable sets, counting elements in finite sets, Inclusion-exclusion principle, Product sets, classes of sets, power of sets, partitions, mathematical Induction.

Unit - IV   08Hours

Probability I: Probability of an event, empirical and axiomatic definition, Probability associated with set theory, addition law, conditional probability, multiplication law, Baye's theorem.

Unit - V   08Hours

Probability II: Random variables (discrete and continuous), Probability density function, cumulative density function, Probability distributions-Binomial, Poisson, Exponential and normal distributions.
Self learning topics: Weibull Distribution

Books

1. Richard A. Johnson, "Probability and Statistics for Engineers", PHI, 5th Edition, 2000.
2. Schaum's outline series, "Probability", McGraw Hill,2nd edition,2000.
3. B.S. Grewal, "Higher Engineering Mathematics, Khanna Publishers", 42nd Edition, 2012.
4. B. V. Ramana, "Higher Engineering Mathematics", Tata McGraw-Hill Education Private Limited, Tenth reprint 2010
5. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons Inc., 9th Edition,2006 and onwards
   E-resourses
1. https://nptel.ac.in/courses/111/106/111106112/

Course Outcome (COs)

At the end of the course, the student will be able to	Bloom's Level
1. Interpret the various data and explain the role of engineers in quality improvement	**[L3]**
2. Explain the basic principles of counting	**[L2]**
3. Explain the set theory	
4. Explain the probabilities and application of Baye's theorem	**[L4]**
5. Extend the basic probability concept to continuous and discrete probability distributions	**[L3]**

Program Outcome of this course (POs)	PO No.
1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	**[PO1]**
2. An ability to identify, formulate and solve engineering problems.	**[PO2]**
3. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	**[PO5]**

Course delivery methods	Assessment methods
1. Lecture and Board	1. CIE
2. PPT	2. Quiz
3. Videos	3. Assignments

Scheme of Continuous Internal Evaluation (CIE):

Components	Addition of two IA tests	Addition of two assignments	Course Activity	Total Marks	
Maximum Marks: 50	30+30	10+10	20	100	
➢ Writing two IA test is compulsory. ➢ CIE will be reduced to 50 marks for the calculation of SGPA and CGPA. ➢ Minimum marks required to qualify for SEE : 20 out of 50.					

Self Study topics shall be evaluated during CIE (Assignments and IA tests) and 10% weightage shall be given in SEE question paper.

Scheme of Semester End Examination (SEE):

1. It will be conducted for 100 marks of 3 hours duration. It will be reduced to 50 marks for the calculation of SGPA and CGPA.

2. **Minimum marks required in SEE to pass: 40 out of 100**

3. Question paper contains 10 questions, 2 from each unit. Students have to answer FIVE full questions choosing one from each unit.

Marks split-up

Unit No.	Marks
1	20
2	20
3	20
4	20
5	20