PROBABILITY AND STATISTICS

B.Tech. III Year I – Semester

(Elective)

Credits	Periods			Exam Hrs.	Sessional Marks	Exam Marks	Total Marks
	Theory	Tutorial	Lab				
3	3	1	-	3	40	60	100

Course Objective:

Purpose to develop a thorough understanding of the methods of probability and statistics which are used to model engineering problems.

Course Outcomes :

By the end of the course, the student will be able to:	
1	Demonstrate the understanding of basic probability axioms and rules and baye's theorem.
2	Explain various concepts of discrete and continuous random variables and calculate moments about origin and mean, conditional expected values.
3	Examine, analyze, and compare Probability distributions.
4	Discuss basic ideas of linear regression and correlation, create and interpret a line of best fit, calculate and interpret the correlation coefficient.
5	Prepare null and alternative hypothesis and test its validity based on random samples.

CO – PO Mapping :

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO-1	**3**	**2**										**1**
CO-2	**3**	**2**										**1**
CO-3	**3**	**2**										**1**
CO-4	**3**	**2**										**1**
CO-5	**3**	**2**										**1**

SYLLABUS

UNIT-I: PROBABILITY [12 Periods]

Probability: Classical – Relative frequency and axiomatic definitions of probability – Addition rule and conditional probability – Multiplication rule – Total probability – Baye's theorem and independence.

UNIT II: RANDOM VARIABLES [12 Periods]

Random variables: Discrete, continuous and mixed random variables – Probability mass – Probability density and cumulative distribution functions – Mathematical expectation – Moments – Moment generating function – Chebyshev's inequality.

UNIT III : PROBABILITY DISTRIBUTIONS [10 Periods]

Binomial Distribution – Mean, variance and standard deviations of Binomial distribution– Poisson distribution – Mean, variance and standard deviations of Poisson distribution – Normal distribution and their properties – Gamma Distribution (All without Proofs).

UNIT IV: CORRELATION & REGRESSION [12 Periods]

Correlation – Linear correlation – Correlation coefficient – Properties of correlation coefficients– Rank correlation coefficients – Regression – Equation of the regression line of Y on X – Equation of regression line of X on Y – Standard error of estimate.

UNIT – V: SAMPLING THEORY [14 Periods]

Formulation of null hypothesis – Critical region – Level of Significance – Large samples test of significance of large samples – Single proportion – Difference between two proportions – Single mean and difference of means – Small samples students t - distribution (Significance test of a sample mean, Significance test of difference between sample means) – F- distribution, χ^2 - test, Goodness of fit.

TEXT BOOK:

1. **Dr. B.S. Grewal**, " *Higher Engineering Mathematics*", 43rd Edition, Khanna Publishers, New Delhi, 2014.

REFERENCE BOOKS:

1. **Kishor S. Trivedi**, "*Probability & Statistics with Reliability, Queuing and Computer Applications",* Prentice Hall of India, 1999.

2. **Richards A. Johnson** , **Miller & Freund's** , "*Probability & Statistics for Engineers*" , Sixth Edition , Prentice Hall of India,2004.

3. **Vijay K. Rohatgi , A.K.Md.Ehsanes Saleh**, "*An Introduction to Probability and Statistics"* , 3rd Edition by, Wiley Series.

4. **T.Veerarajan** , *"Probability, Statistics and Random Processes"* , Tata McGraw Hill Publications.