

PROBABILITY AND STATISTICS

III Semester: AE / ME / CE									
Course Code	Category	Hours / Week			Credits	Maximum Marks			
		L	T	P		C	CIA	SEE	Total
AHSB12	Foundation	3	1	-	4	30	70	100	
Contact Classes: 45		Tutorial Classes: 15		Practical Classes: Nil		Total Classes: 60			
I. COURSE OVERVIEW:									
<p>Probability theory is the branch of mathematics that deals with modelling uncertainty. Inferential Statistics and regression analysis together with random variate distributions are playing an exceptional role in designing data driven technology which is familiarly known as data centric engineering. They also have wide variety applications in telecommunications and other engineering disciplines. The course covers advanced topics of probability and statistics with applications over real-world engineering problems.</p>									
II. OBJECTIVES:									
The course should enable the students to:									
<p>I The Principles of probability, the theory of random variables, basic random variatedistributions and their applications.</p> <p>II The Methods and techniques for quantifying the degree of closeness among two or more variables and linear regression analysis.</p> <p>III The Estimation statistics and Hypothesis testing which play a vital role in the assessment of the quality of the materials, products and ensuring the standards of the engineering process.</p> <p>IV The statistical tools which are essential for translating an engineering problem into probability model.</p>									
III. COURSE OUTCOMES:									
After successful completion of the course, students should be able to:									
CO 1	Explain the concepts of Baye's theorem, discrete and continuous random variables under randomized probabilistic conditions.						Understand		
CO 2	Interpret the parameters of random variants Probability distributions such as Binomial, Poisson and Normal distribution by using their probability functions, expectation and variance.						Understand		
CO 3	Apply Bivariate Regression as well as Correlation Analysis for statistical forecasting.						Apply		
CO 4	Make Use of estimation statistics in computing confidence intervals, Regression analysis and hypothesis testing.						Apply		
CO 5	Identify the role of statistical hypotheses, types of errors, confidence intervals, the tests of hypotheses for large sample in making decisions over statistical claims in hypothesis testing						Apply		
CO 6	Identify the tests of hypothesis for small sample in making decisions over statistical claims in hypothesis testing						Apply		
IV. SYLLABUS:									
MODULE-I	PROBABILITY AND RANDOM VARIABLES						Classes: 09		
Probability, Conditional Probability, Baye's Theorem; Random variables: Basic definitions, discrete and continuous random variables; Probability distribution: Probability mass function and probability density functions; Mathematical expectation.									
MODULE -II	PROBABILITY DISTRIBUTION						Classes: 09		
Binomial distribution; Mean and variances of Binomial distribution, Recurrence formula for the Binomial distribution; Poisson distribution: Poisson distribution as a limiting case of Binomial distribution, mean and variance of Poisson distribution, Recurrence formula for the Poisson distribution; Normal distribution; Mean, Variance, Mode, Median, Characteristics of normal distribution.									

MODULE -III	CORRELATIONS AND REGRESSION	Classes: 09
<p>Correlation: Karl Pearson's Coefficient of correlation, Computation of correlation coefficient, Rank correlation, Repeated Ranks; Properties of correlation.</p> <p>Regression: Lines of regression, Regression coefficient, Properties of Regression coefficient, Angle between two lines of regression; Multiple correlation and Regression.</p>		
MODULE -IV	TEST OF HYPOTHESIS - I	Classes: 09
<p>Sampling: Definitions of population, Sampling, Parameter of statistics, standard error; Test of significance: Null hypothesis, alternate hypothesis, type I and type II errors, critical region, confidence interval, level of significance. One sided test, two sided test. Large sample test: Test of significance for single mean, Test of significance for difference between two sample means, Tests of significance single proportion and Test of difference between proportions.</p>		
MODULE -V	TEST OF HYPOTHESIS - II	Classes: 09
<p>Small sample tests: Student t-distribution, its properties: Test of significance difference between sample mean and population mean; difference between means of two small samples. Snedecor's F-distribution and its properties; Test of equality of two population variances Chi-square distribution and its properties; Test of equality of two population variances Chi-square distribution, its properties, Chi-square test of goodness of fit.</p>		
Text Books:		
<ol style="list-style-type: none"> 1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons Publishers, 9th Edition, 2014. 2. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 42nd Edition, 2012. 		
Reference Books:		
<ol style="list-style-type: none"> 1. S. C. Gupta, V. K. Kapoor, "Fundamentals of Mathematical Statistics", S. Chand & Co., 10th Edition, 2000. 2. N. P. Bali, "Engineering Mathematics", Laxmi Publications, 9th Edition, 2016. 3. Richard Arnold Johnson, Irwin Miller and John E. Freund, "Probability and Statistics for Engineers", Prentice Hall, 8th Edition, 2013. 		
Web References:		
<ol style="list-style-type: none"> 1. http://www.efunda.com/math/math_home/math.cfm 2. http://www.ocw.mit.edu/resources/#Mathematics 3. http://www.sosmath.com 4. http://www.mathworld.wolfram.com 		
E-Text Books:		
<ol style="list-style-type: none"> 1. http://www.keralatechnologicaluniversity.blogspot.in/2015/06/erwin-kreyszig-advanced-engineering-mathematics-ktu-ebook-download.html 2. http://www.faadooengineers.com/threads/13449-Engineering-Maths-II-eBooks 		