

Course Number and Name	
BMA501 - PROBABILITY AND STATISTICS IN CIVIL ENGINEERING	
Credits and Contact Hours	
4 & 45	
Course Coordinator's Name	
Dr.Ramya	
Text Books and References	
TEXT BOOKS	
1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 9th extensively revised edition, Sultan Chand & Sons, 1999	
2. Ross. S., "A first Course in Probability", Fifth Edition, Pearson Education, Delhi 2002. Johnson. R. A., "Miller & Freund's Probability and Statistics for Engineers", Sixth Edition, Pearson Education, Delhi, 2000.	
3. Walpole, R. E., Myers, R. H. Myers R. S. L. and Ye. K., "Probability and Statistics for Engineers and Scientists", Seventh Edition, Pearsons Education, Delhi, 2002.	
4. Lipschutz. S and Schiller. J, "Schaum's outlines - Introduction to Probability and Statistics", McGraw-Hill, New Delhi, 1998.	
5. Veerarajan T., Probability, Statistics and Random Processes, Tata McGraw Hill, 1st Reprint 2004.	
Course Description	
<ul style="list-style-type: none"> To develop a thorough understanding of the methods of probability and statistics which are used to model engineering problems. 	
Prerequisites	Co-requisites
Numerical method	NIL
required, elective, or selected elective (as per Table 5-1)	
Course Outcomes (COs)	
CO1	To apply the basic rules and theorems of probability theory such as Baye's Theorem, to determine probabilities that help to solve engineering problems and to determine the expectation and variance of a random variable from its distribution
CO2	To appropriately choose, define and/or derive probability distributions such as the Binomial, Poisson and Normal etc to model and solve engineering problems
CO3	To learn how to formulate and test hypotheses about means, variances and proportions and to draw conclusions based on the results of statistical tests.
CO4	To understand how regression analysis can be used to develop an equation that estimates how two variables are related and how the analysis of variance procedure can be used to determine if means of more than two populations are equal.

CO5	To understand the fundamentals of quality control and the methods used to control systems and processes.
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Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k
CO1	H			M	H		M			M	
CO2			M								
CO3	M			H						M	
CO4					H		H				
CO5	H									H	

List of Topics Covered

UNIT I PROBABILITY AND RANDOM VARIABLES	9
Sample space, Random experiments and random variables, Concept of probability, Conditional probability, Addition and multiplication laws, Baye's theorem - One dimensional Random Variables- Expectation, Variance, Covariance, and Moments.	
UNIT II THEORETICAL DISTRIBUTIONS DISCRETE:	9
Binomial, Poisson, Geometric, Negative Binomial; Continuous: Exponential and Normal Distributions, their properties and applications to industrial problems.	
UNIT III TESTING OF HYPOTHESIS	9
Introduction – Large sample tests based on normal distribution - Test for single mean, difference between means, proportion, difference between proportion, Small sample tests based on t, distributions- Test for single mean, difference between means, standard deviation, difference between standard deviation. Chisquare test for goodness of fit, independence of attributes.	
UNIT IV CORRELATION, REGRESSION AND ANALYSIS OF VARIANCE	9
Pearson's Correlation coefficient- Spearman's Rank correlation coefficient. Regression-Concepts – Regression lines – Multiple correlation and regression. Analysis of Variance- One-way classification and two way classification.	
UNIT V STATISTICAL QUALITY CONTROL	9
Introduction – Process control – control charts for variables - X and R, X and S charts control charts for attributes: p chart, np chart, c chart and their applications in process control.	