Devi Ahilya University, Indore, India Institute of Engineering & Technology				MSc – II Year (Applied Mathematics) with Specialization in Computing & Informatics Semester- III			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
AM3PC3: Mathematical Statistics	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
	3	**1**	**-**	**3**	**1**	**-**	**4**
Duration of Theory Paper: 3 Hours							

Objective: To equip the student with the mathematical theory of statistics underlying the modern practices and applications of statistics to engineering, physics & astronomy, quality assurance & reliability, drug development, public health & medicine, the design of agriculture or industrial experiments, experiments of psychology and so forth.
Prerequisites: Elementary probability & statistics.

COURSE OF CONTENTS

UNIT I
Review of probability –Random variable and Distribution function. Marginal and joint Probability distribution, Mathematical expectation of sum and product of random Variables. Moments, Cumulates and their interpolationship. Moment generating function and cumulate generating function, Binomial Normal and Poisson distribution with their properties.

UNIT II
Correlation and Regression; definition, regression coefficient; lines of regression; partial and multiple correlations, concept of estimation, definition of unbiasedness, Consistency and Efficiency, Statistical Decision making: Risk function, loss function; baye's approach.

UNIT III
Theory of Sampling, Standard error, Population and Sample Survey Methods, Test of significance for Mean, Variance, Proportion and correlation Coefficient., Sampling distribution- Chi-square test, t-test and F-distribution, Test of Hypothesis, Type I and II Error, Neyman's Pearson's Carpell Pearson's Lemma for Best Critical Region, Construction of test for mean and variance based on Neyman's Pearson's Lemma.

UNIT IV
Analysis of variance for one and two way classified data, Statistical Quality Control, Definitions, Control Charts, process capability, Acceptance Sampling: Single, Double and sequential sampling plans, O.C. curves, producer's and consumer's risk, A brief idea of Taguchi method.

UNIT V
Stochastic Process: Classification of stochastic processes, Autocorrelation function Poissonian Process-Queuing and birth and death process; Markovian process. Renewal theory. Reliability: Basic Concepts, Evaluation of system reliability.

BOOKS RECOMMENDED:
[1] S.C.Gupta & V.K.Kapoor, Fundamentals of Mathematical statistics, Sultan Chand & Sons., 2000.
[2] Freund John E, Mathematical statistics, PHI, N.D., 7th Ed., 2010.
[3] Papoulis Athanasios & S. Unnikrishna Pillai, Probability, Random variables and Stochastic processes, Mc-graw Hill Book Co., 4th Ed. 2002.
[4] S.C.Gupta, Fundamentals of Statistics, Himalaya Publishing House, Mumbai, 6th Ed., 2009.

[5] K. S. Trivedi, Probability and statistics with reliability, queuing, and computer science applications, John Wiley & Sons, 2006.
[6] T. Veerarajan, Probability, Statistics And Random Processes, Tata McGraw-Hill Education, 2002.