

**MA4331**  
**Statistics and Queuing Theory**  
**MCA**

**L-T-P : 3-0-0****Credits : 3**

Topic	No.of Hours
<b>Random Variables and their Distributions:</b>	
Review of Probability concepts and Baye's Theorem	2
Random variables (discrete and continuous), probability functions, density and distribution functions	4
special distributions (Binomial, Hypergeometric, Poisson, Uniform, exponential and normal), Mean and variance	8
Chebyshev's inequality, Joint probability mass function, marginal distribution function, joint density function	3
<b>Testing of Hypothesis:</b>	
Correlation, regression	3
Testing of Hypothesis, Null and alternative hypothesis, level of significance, one-tailed and two-tailed tests	1
goodness of fit	2
tests for large samples (tests for single mean, difference of means)	2
tests for small samples (t, F, and Chi-square tests)	3
contingency tables, analysis of variance (one-way classification), Non-parametric tests	1
<b>Testing of Estimates:</b>	
Estimation, point and interval estimates, unbiased and efficient estimators	1
estimation of parameters by the method of moments and maximum likelihood method	2
<b>Queueing Theory:</b>	
Concepts, applicability	1
Poisson queues	2
Erlang distribution, Erlang service time queueing models	1
birth and death process	1
classification	1
single server, multiple server, queueing models, infinite (including waiting times) and finite capacities	4
<b>Total</b>	<b>42</b>

**Learning Resources:****Text Books:**

1. Miller & Freund's Probability and Statistics for Engineers, **Richard A. Johnson**, Pearson, 2018, Ninth Edition
2. Modern Elementary Statistics, **John E. Freund and Benjamin M. Perles**, Pearson, 2013, Twelfth Edition
3. Operations Research: An Introduction, **Hamdy A. Taha**, Pearson, 2017, Tenth Edition

**Reference Books:**

1. Fundamentals of Mathematical Statistics, **S. C. Gupta and V. K. Kapoor**, Sultan Chand & Sons, 2020, Twelfth Edition
2. Operations Research, **Kanti Swarup, P. K. Gupta and Man Mohan**, Sultan Chand & Sons, 2014

**Scheme of evaluation**

Test	Weightage
Assignments/Quizzes	20%
Two tests (first test after six weeks of instruction and second test after 10 weeks of instruction)	40%
End Semester Examination	40%