

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
BSC-301	Introduction to Probability and statistics	BSC	3	3	0	0	50	100	150

**Course Outcomes:**

At the end of the course, students will be able to

CO1	Explain the concept of number theory.
CO2	Apply the concepts of Machine learning in real world
CO3	Appreciate the importance of data in machine learning.
CO4	Implement the concept of Hypothesis testing.
CO5	Assimilate the knowledge of the Stochastic Process.

**Detailed Syllabus****Section-A**

**Unit 1:** Greatest Common Divisors and Prime Factorization: Greatest common divisors, The Euclidean algorithm, The fundamental theorem of arithmetic, Factorization of integers and the Fermat numbers  
 Congruences: Introduction to congruences, Linear congruences, The Chinese remainder theorem, Systems of linear congruence. **(8 Hrs.)**

**Unit 2:** Linear Programming: Elementary theory of convex set, definition of general LPP, Formulation problem of LPP. Example of LPP, problem occurring in various fields, graphical and simplex method of solving an LPP, artificial variable, duality of LPP. **(8 Hrs)**

**Unit 3** Queuing Theory: Introduction, elements of a Queuing model, Queuing process, Fundamental Structure of a Queuing System, Probability distributions in Queuing system, Classification of Queuing models (Single server and multi-server), Queuing Model Arrival-Departure Equations for M/M/1 Queuing Model Operating Characteristics for the M/M/1 Queuing Model **(8 Hrs)**

**Section-B**

**Unit 4:** Unit 4: Concept of Non-parametric tests, advantages of Non-parametric tests over parametric tests. Sign test for single sample and two sample problems (for paired and independent samples), Wilcoxon-signed rank test, Mann-Whitney U-test, Run test, Median test and test for independence based on Spearman's rank correlation **(8 Hrs)**

**Unit 5:** Stochastic Processes and Markov Chains: Introduction to Stochastic Processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher-order Markov process, n-step transition probabilities, Markov chain, Steady state condition, Markov analysis. **(8 Hrs.)**

**Text Books**

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Discrete Mathematics	Kenneth Rosen	McGraw Hill Education	7 <sup>th</sup> (2017)
2	Probability & Statistics for Engineers & Scientists	Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye	Pearson Publishers	9 <sup>th</sup> (2016)

**Reference Books**

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Introduction to Probability and Statistics for Engineers and Scientists	Sheldon M. Ross	Academic Press	5 <sup>th</sup> (2014)