BAPATLA ENGINEERING COLLEGE::BAPATLA

(Autonomous)

MATHEMATICAL FOUNDATIONS FOR DATA SCIENCE II B. Tech. IV Semester 20DS401/MA06								
Lectures	:	2 Hours/Week	Tutorial	:	1 Hour/Week	Practical	:	0
CIE Marks	:	30	SEE Marks	:	70	Credits	:	3

Pre-Requisite: None

Course Objectives: Students will learn how to

➢	Compute various measures of central tendency, dispersion, skewness, kurtosis and interpret them.
➢	Learn about elementary nonparametric testing procedures and use them for analyzing real data for drawing statistical inferences and also are able to design, use and interpret control charts for both variables and attributes.
➢	Model competitive real-world phenomena using concepts from game theory, analyze pure and mixed strategies
➢	Select best strategy from various alternatives of decision making under uncertainity Conditions using different criterion for uncertainity and also can apply dynamic programming approach to real world problems wherever applicable

Course Outcomes: After studying this course, the students will be able to

CO-1	Analyze the whole idea on a frequency distribution with the help of measures of central tendency, measures of dispersion, skewness andkurtosis.
CO-2	Adapt nonparametric testing procedures for drawing statistical inferences in data analysing problems and Construct Quality control chats for variables and attributes.
CO-3	Solve Games with/without saddle points using algebraic method, graphical method and principle of dominance for achieving optimum best mixed strategies.
CO-4	Utilize dynamic programming algorithm to solve real world problems and choose appropriate decision under uncertainty conditions

Mapping of Course Learning Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO-1	3	2	2	-	-	-	-	-	-	-	-	2	-	2	-
CO-2	3	2	3	-	-	-	-	-	-	-	-	2	-	3	-
CO-3	2	2	2	-	-	-	-	-	-	-	-	2	-	2	-
CO-4	2	2	2	-	-	-	-	-	-	-	-	2	-	2	-

UNIT-1	(12 Hours)

Descriptive Statistics:

Measures of central tendency: Arithmetic mean, median and mode

Measures of dispersion: Dispersion, measures of dispersion, range, quartile deviation, mean deviation, standard deviation and root mean square deviation, Moments, skewness, kurtosis.

(Sections: 2.3, 2.5, 2.6, 2.7, 3.1, 3.3, 3.4, 3.5, 3.6, 3.7, 3.7.1, 3.7.2, 3.9, 3.9.1, 3.13, 3.14 of Text Book 1)

UNIT-2	(12 Hours)

Non-Parametric Tests: Introduction**,** Sign test, Rank-sum test, Correlation based on ranks, tests of randomness, Kolmogorov Smirnov and Anderson-Darling tests.

Statistical Quality Control: Quality control, Control charts for measurements, Control charts for attributes, Tolerance limits.

(Sections: 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 15.4, 15.5, 15.6, 15.7 of Text Book 2)

UNIT-3	(12 Hours)

GAMES AND STRATEGIES: Introduction; Two-person Zero –Sum Games; Some Basic terms; The Maximin-Minimax Principle; Games Without Saddle Points-Mixed Strategies; Graphic Solution of 2xn and mx2 games; Dominance Property.

(Sections:17.1, 17.2, 17.3, 17.4, 17.5, 17.6, 17.7 of Text Book 3)

UNIT-4	(12 Hours)

Decision Analysis: Introduction, Decision making problem, Decision-making process, Decision-making environment, Decisions under uncertainty.

DYNAMIC PROGRAMMING: Introduction; The Recursive Equation Approach, Characteristics of Dynamic Programming; Dynamic Programming Algorithm.

(Sections: 16.1, 16.2, 16.3, 16.4, 16.5, 13.1, 13.2, 13.3, 13.4 of Text Book 3)

Text Books :	1. Fundamentals of Mathematical Statistics, S.C. Gupta and V.K. Kapoor, 10^{th}edition. 2. Probability and Statistics for Engineers, Richard A. Johnson, 8th edition, PHI. 3. Operations Research, Kanti Swaroop, P.K. Gupta, Manmohan, 13th edition, Sultan Chand & Sons. 2007.
References :	[1] 1. Probability & Statistics for Engineers and Scientists', R.E Walpole, R.H. Myers & S.L. Myers, 6th edition,PHI, [2] Operations Research, SD Sharma, Kedarnath Ramnath & Co, Meerut.