GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Bachelor of Technology					Branch/Spec.	Computer Science & Engineering (CSE/BDA/CS/AI&ML)		
Semester	IV					Version	1.0.0.2		
Effective from Academic Year			2026-27			Effective for the batch Admitted in			June 2025
Subject code	2CSE401		Subject Name			Probability & Statistics			
Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

Pre-requisites:

Recursion, Principle of Mathematical induction, Graph Plotting

Learning Outcome:

Upon completion of this course, students will be able to:

- Understand all basic fundamentals of Statistics
- Understand proper interpretation of the system based on parameters of probability distribution.
- Apply knowledge of statistics and Probability to form a mathematical model
- Apply concepts of probability and statistics to process the raw data through simulation and/or programming.

Theory syllabus

Unit	Content	Hrs
1	**Measures Of Central Tendency:** Introduction, Arithmetic Mean, Simple and weighted for raw data, Discrete frequency distribution, Continuous frequency distribution, Properties of A.M., Merits & Demerits of A.M., Median for raw data, Discrete frequency distribution, Continuous frequency distribution, Merits and demerits of Median, Mode for raw data, Merits & demerits of mode.	8
2	**Measures Of Dispersion:** Introduction, Range, coefficient of range, Quartiles, Quartiles deviations, coefficient of quartile deviations, Mean deviation and coefficient of mean deviation, S.D and variance for all types of frequency distribution, Coefficient of Dispersion, Coefficient of variation.	7
3	**Skewness, Moments and Kurtosis** Introduction, Symmetrical and Asymmetrical Distributions	2
4	**Probability Theory:** Introduction, Random Experiment, Sample Space, Events, Complementary Events, Union and Intersection of Two Events, Difference Events, Exhaustive Events, Mutually Exclusive Events, Equally Likely Events, Independent Events, Mathematical & Statistical definition of Probability, Axiomatic definition of probability, Addition Theorem, Multiplication Theorem, Theorems of Probability, Conditional Probability, Inverse Probability.	7
5	**Random Variables** Discrete Random Variable, Probability Function, Probability Distribution, Continuous Random Variable, Probability Density Function (PDF), Cumulative Density Function (CDF), Properties of CDF, 2D Random Variables, Joint PDF and CDF, Marginal and Conditional Probability Distributions	9

6	**Probability Distributions:** Binomial Distribution: Introduction, Probability mass function of Binomial distribution, Mean and Variance of Binomial distribution, Properties of Binomial Distribution, Uses of Binomial Distribution. Poisson Distribution: Introduction, Probability mass function of Poisson distribution, Mean and Variance of Poisson distribution, Properties of Poisson Distribution, Applications of Poisson Distribution. Normal Distribution: Introduction, Probability density function of Normal distribution, Properties of Normal distribution, Importance of Normal Distribution. Uniform Distribution: Introduction, Probability mass function of Uniform distribution, Mean and Variance of Uniform distribution, Properties of Uniform Distribution, Applications of Uniform Distribution.	8
7	**Correlation** Definition of Correlation, Types of Correlation, Karl Person's Correlation Coefficients, Correlation Coefficients for Bivariate frequency distribution. Definition of Regression, Regression lines, Regression Coefficients.	4

Practical content

- The practicals will be based on implementation of various statistical methods, probabilistic models and probability distributions.
- Tools can be Excel, Matlab, Octave etc. to perform the practical.

Text Books	
1	Probability, Statistics and Random Process by T Veerarajan, TMH.
2	Statistical Methods by S. P. Gupta, Sultan Chand Publication

Reference Books	
1	Fundamental of Applied Statistic by S.C. Gupta & V.K. Kapoor , Sultan Chand Publication
2	Probability, random variables and stochastic processes by A. Papoulis and S.U. Pillai, TMH
3	Business Statistics by Prof. H.R. Vyas & Others, B.S. Shah Prakashan

Course Outcomes:	
COs	Description
CO1	Understand all basic fundamentals of Statistics
CO2	Understand proper interpretation of the system based on parameters of probability distribution.
CO3	Apply knowledge of statistics and Probability to form a mathematical model
CO4	Apply concepts of probability and statistics to process the raw data through simulation and/or programming.

Mapping of CO and PO

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	3	0	2	1	3	2	0	1	0	3	3
CO2	3	2	0	2	3	1	2	0	3	0	2	3
CO3	1	2	0	1	3	2	1	0	1	0	1	2
CO4	2	0	0	2	3	2	2	1	2	0	2	3