






**Level 5 Diploma in Foundations of Data Science Statistical
Methods using Excel (951) 177 Credits**

Unit: Probability Distribution	Guided Learning Hours: 300
Exam Paper No.: 3	Number of Credits: 30
Prerequisites: Business terms and Excel knowledge.	Corequisites: A pass or higher in Diploma in Analytics or equivalence.
<p>Aim: A distribution is a collection of data on a variable. Probability Distributions or simply Probabilities, measure the likelihood of an outcome depending on how often it is featured in a sample space. Distributions Characteristics are:</p> <ul style="list-style-type: none"> • mean • variance <p>We measure spread by how far away from the mean all the values are. <i>The more dispersed the data; the higher/greater the variance.</i></p> <p>Types of Probability Distributions can be categorised as:</p> <ul style="list-style-type: none"> • Rolling a dice or picking a card has a finite number of outcomes. They follow discrete distributions. • Recording time and distance have infinite outcomes (many). They follow continuous distributions. <p>The purpose of the course is to enable learners understand real-life examples of both discrete and continuous distributions and the role of distribution in data science.</p>	
Required Materials: Recommended Learning Resources.	Supplementary Materials: Lecture notes and tutor extra reading recommendations.
Special Requirements: The unit requires a combination of lectures, demonstrations, discussions, and hands-on labs.	
<p>Intended Learning Outcomes:</p> <ol style="list-style-type: none"> 1. Understand the various terminologies and axioms used in probability theory. 2. Understand the finite/countable infinite values in relation to Probability Mass Function and Cumulative Distribution Function of discrete variables. 3. Understand the relationship between Geometric distribution, Bernoulli distribution and Binomial Distribution. 4. Understand the infinite values of continuous random variables in relation to Probability Density Function and Cumulative Distribution Function. 	<p>Assessment Criteria:</p> <ol style="list-style-type: none"> 1.1 Describe probability distribution. 1.2 Explore types of probability distribution. 1.3 Be able to describe Bernoulli events. 1.4 Differentiate Bernoulli vs Binomial events. 1.5 Explain when Poisson Distribution is used. 1.6 Identify Continuous Distributions. 1.7 Itemise different continuous distributions. 2.1 Describe Binomial distributions. 2.2 Demonstrate using Binomial distribution in Excel. 2.3 Describe real life uses of Binomial distribution. 2.4 Describe Poisson distribution. 2.5 Be able to use Poisson distribution in Excel. 3.1 Define Geometric distribution. 3.2 Be able to calculate Cumulative Geometric Probability. 3.3 Demonstrate using Geometric distribution in Excel 3.4 Define Negative Binomial Distribution. 3.5 Explore real life examples of Geometric Distribution. 4.1 Define Normal Distribution. 4.2 Be able to create Normal Distribution in Excel. 4.3 Describe real life example of Normal Distribution. 4.4 Demonstrate creating t-Distribution in Excel.

5. Understand single parameter distribution; degrees of freedom and goodness of fit test.	4.5	Describe differences between Normal Distribution and t-Distribution.
	5.1	Define sentiment analysis.
	5.2	Demonstrate performing chi-square goodness of fit test in Excel.
	5.3	Explore uses of chi-square in real life.
	5.4	Define Uniform Distribution.
	5.5	Describe Exponential Distribution.
5.6 Describe Memoryless Property		
Methods of Evaluation: A 2½ hour essay written paper with 5 questions, each carrying 20 marks. Candidates are required to answer all questions. Candidates also undertake project/coursework in Probability Distribution with a weighting of 100%.		

Recommended Learning Resources: Probability Distribution

Text Books	<ul style="list-style-type: none"> Probability & Distribution by Anusha Illukkumbura. ISBN-13 : 979-8651587940 Probability and Statistics for Data Science & Machine Learning by Mr Simit Tomar. ISBN-13 : 979-8681078982 Probability Distribution: Applied Mathematics by M. D. PETALE. ISBN-13 : 978-1714123254
Study Manuals 	BCE produced study packs
CD ROM 	Power-point slides
Software 	Excel