

Module Title:	Elements of Distribution Theory
Module ID:	STAT 111
Prerequisite:	None
Level:	6
Credit Hours:	3 (3+0+1)

Module Description:

Random experiment, The sample space, Events, Definition of probability
 Axioms of probability theory, Conditional probability and Independence , Bayesian theory , Random Variable, Discrete Random Variable, Continuous random Variable, Probability Mass Function, Probability Density Function, Cumulative Distribution Function, Expectation, Variance and Moment for Discrete random variable, Moment generating function, Binomial Distribution, Poisson Distribution, Geometric Distribution, Hyper-geometric Distribution, Negative Binomial Distribution, Uniform Distribution. Exponential Distribution, Normal Distribution, Standard Normal Distribution

Module Aims:

- Know the basic axioms and set theory upon which probability theory is based including sample spaces and events, mutual exclusivity, conditional probability, independence, and Bayes theorem..
- Understand the concept of random variables and probability mass functions, densities, and distributions.
- Understand the concept of expectation and be able to apply it in decision making
- Understand the mean and variance of a random variable.
- Know various well-known distributions and how they are used in practice.
- Understand joint, marginal, and conditional distributions
- Be able to apply probability theory to solve probability problems.

Learning Outcomes:

- The student recognizes the principles of the theory of distribution.
- The student recognizes discrete random variable and continuous random variable.
- The student should be able to use these principles in the solving problems.
- The student recognizes the appropriate distribution and how it is used in applications.
- The ability to know the concept of discrete and random variable and The concept of continuous random variable.
- The development of the student's ability to use these concepts to solve problems.
- The development of the student's ability to apply these concepts to solve applications.

List of Topics	No. of Weeks	Contact Hours
Random experiment The sample space.	1	3
Events.	1	3
Definition of probability Axioms of probability theory	1	3
Conditional probability Independence	1	3
Bayesian theory	1	3
Random Variable Discrete Random Variable	1	3
Revision and Test 1	1	3
Continuous random Variable Probability Mass Function	1	3
Probability Density Function Cumulative Distribution Function	1	3

Expectation, Variance and Moment for Discrete random variable Moment generating function	1	3
Binomial Distribution Poisson Distribution	1	3
Test2 Geometric Distribution	1	3
Hyper-geometric Distribution Negative Binomial Distribution	1	3
Uniform Distribution Exponential Distribution	1	3
Normal Distribution Standard Normal Distribution	1	3

Textbook:

Joseph McKean. Hogg and Crage, Probability and Mathematical Statistics