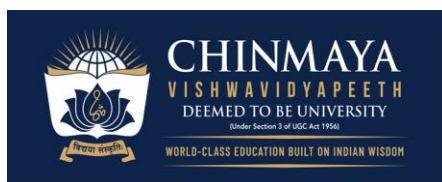


## Combinatorics, Statistics and Basic Probability



**Course Name: Combinatorics, Statistics and Basic Probability**

**Programme in which it is offered: B.Sc. B. Ed**

<b>Course Category:</b> Core	<b>Schedule of Offering:</b> Odd
<b>Course Credit Structure:</b> 4	<b>Course Code:</b> PS 151
<b>Total Number of Hours:</b> 75	<b>Contact Hours Per Week:</b> 5
<b>Lecture:</b> 3	<b>Tutorial:</b> 1
<b>Practical:</b> 0	<b>Medium of Instruction:</b> English
<b>Date of Revision:</b>	<b>Skill Focus:</b> Employability
<b>Short Name of the Course:</b> CSP	The course is considered as a <b>Minor/Elective/ in any other school:</b> Not <b>Applicable</b>

### Course Description

This course is offered as a Core Course for B.Sc. B. Ed (Mathematics) students. The students will learn about certain mathematical and statistical tools that are used in a business environment

### Course Introduction

To enable the students to understand the basic concepts of combinatorics, statistics and probability, to obtain the skills and apply them in problem-solving and teaching (as part of assessment of learners).

### Course Objective

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1. To familiarize the students regarding the concepts and techniques in Combinatorics
2. To sensitize the students regarding the application of Statistics in solving real life problems.
3. To make the students aware about the business statistical methods
4. To develop the student's ability to deal with numerical and quantitative issues in business

### Course Outcomes

At the end of the course student will be able to

1. Understands different types of Lattices.
2. Study concepts like permutation and combination, pigeon hole principle, Principle of inclusion and exclusion and solve real life problems based on them.
3. Analyse data using different types of charts and graphs.
4. Apply the concept of Probability and random variable in various problem situations.
5. Able to calculate probability and value of a random variable.

### PO-CO Mapping

PO-CO Mapping Matrix

CO/PO Mapping	PO1	PO2	PO3	PO4
CO1	X			

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CO2		X		
CO3		X		
CO4		X		
CO5		X		

### Prerequisites

The course does not require any pre-requisites. It is offered to all the students of B.Sc. B.Ed(Mathematics).

### Pedagogy

The course will be taught in theory-based mode through lectures. The course instructor will also give presentations to the students for better understanding of the concepts.

### Suggested Reading:

1. C. L. Liu (1986), Elements of Discrete Mathematics, McGraw-Hill Education.
2. Kenneth H. Rosen (2002), Discrete Mathematics and its Applications, McGraw-Hill Education.
3. Alexander M. Mood and Others (1988), Introduction to the Theory of Statistics, McGraw Hill Education.
4. Charles M. Grinstead and Laurie Snell J. (1991), Introduction to Probability , Rhode Island, American Mathematical Society.

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5. Gupta S.C and Kapur (2011), Fundamentals of Mathematical Statistics, Sultan Chand and Co, New Delhi.
6. Richard Serfozo (2003), Basic Probability Problems, London, Springer.
7. Robert V. Hogg and Allen T. Craig (1978), Introduction to Mathematical Statistics, McMillan Publishing Co.

### Module Sessions

#### Module I: Lattices and Boolean Algebra

(15 Hours)

Partially ordered sets, Lattices, Complete lattices, Distributive lattices, Complements, Boolean Algebra, Boolean expressions, Application to switching circuits.

#### Readings:

1. C. L. Liu (1986), Elements of Discrete Mathematics, McGraw-Hill Education.
2. Kenneth H. Rosen (2002), Discrete Mathematics and its Applications, McGraw-Hill Education.

#### Activities:

- a) Quiz
- b) Assignment

#### Module II: Permutations and Combinations

(10 Hours)

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Permutations and Combinations, Pigeon-hole principle, Principle of inclusion and exclusion. Solving real life problems based on them.

### Reading:

1. Kenneth H. Rosen (2002), Discrete Mathematics and its Applications, McGraw-Hill Education.
2. Robert V. Hogg and Allen T. Craig (1978), Introduction to Mathematical Statistics, McMillan Publishing Co.

### Activities:

- a) Quiz
- b) Assignment

## Module III: Introduction to statistics

(25 Hours)

Introduction to statistics- Mean, Mode and Median of grouped and un-grouped data, Graphical representations - Pie Charts, Line Graphs, Bar Graphs, Histograms, frequency polygon. Measures of dispersion - Range, Mean deviation, Variance and Standard deviation. Analysis of frequency distribution.

### Reading:

1. Charles M. Grinstead and Laurie Snell J. (1991), Introduction to Probability , Rhode Island, American Mathematical Society.
2. Gupta S.C and Kapur (2011), Fundamentals of Mathematical Statistics, Sultan Chand and Co, New Delhi.

### Activities:

- a) Quiz
- b) Assignment

**Module IV: Basics of Probability**

**(25 Hours)**

Random experiment, Concept of probability, Sample space, Events- different kinds  
Probability definitions – Mathematical or Classical or Statistical, Conditional  
probability, Independent events, Bayes' theorem.

Random variable, Discrete and continuous random variables, Probability function,  
Probability density function, Distribution function. Mean Variance and standard  
deviation of a random variable.

**Reading:**

1. Charles M. Grinstead and Laurie Snell J. (1991), Introduction to Probability  
, Rhode Island, American Mathematical Society.
2. Gupta S.C and Kapur (2011), Fundamentals of Mathematical Statistics,  
Sultan Chand and Co, New Delhi.
3. Richard Serfozo (2003), Basic Probability Problems, London, Springer.

**Activity:**

- a) Quiz
- b) Assignment

**Evaluation Pattern**

## Combinatorics, Statistics and Basic Probability

	Component Type	Weightage Percentage	Total Marks	Tentative Dates	Course Outcome Mapping
<b>Continuous Internal Assessment (CIA) Components</b>	Mid-term Exam	50 % of CIA Marks	30	10 <sup>th</sup> week	1,2,3
	Quiz	25% of CIA Marks	15	Weekly	1,2
	Assignments	25 % of CIA Marks	15	At the end of each module	1,2,3,4,5
	CIA Marks	100 % (To be converted to 60%)	60		
	ESE	40%	40	End of the Semester	1,2,3,4,5