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## FACULTY OF ENGINEERING & TECHNOLOGY

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# LECTURE- 18

BSc (AG)  
2<sup>nd</sup> Year , IIIrd Sem.  
Statistical Methods  
AES-213



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## Outline of lecture

- Probability Theory
- Introduction
- Definition & Formula
- Notations in Probability
- Addition & Multiplication theorem of Probability
- Suggested Readings & References



## Introduction

Probability is a most important topic in Mathematics.

It is very much used in daily life, game theory, agriculture or predicting the result, share market, etc.

Probability is a mathematical measure of uncertainty.

Probability is also called chance of success or failure.

Let 'A' be an event, probability of A is denoted by  $P(A)$  and define as-

$$P(A) = \frac{\text{favourable events}}{\text{total events}}$$

The value of probability lies between 0 to 1. i.e.

$$P(A)=0 \quad \text{or} \quad P(A)=1 \quad \text{or} \quad 0 < P(A) < 1$$

## Notation of Probability

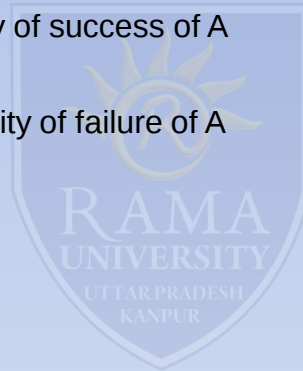
Let  $A$  and  $B$  are two events so

$P(A)$  define as probability of  $A$  or probability of success of  $A$

$P(A')$  define as probability of  $A'$  or probability of failure of  $A$

$P(A \cup B)$  define as probability of  $A$  or  $B$

$P(A \cap B)$  define as probability of  $A$  and  $B$



## Definitions

- Let  $A$  is an event. All possible outcomes in a trial are known as Exhaustive events.
- Two events  $A$  and  $B$  are said to be Mutually exclusive events if  $P(A \cap B) = 0$ .
- Two events  $A$  and  $B$  are said to be Independent events if  $P(A \cap B) = P(A) \cdot P(B)$



## Theorem of Probability

Let A and B are two events.  $P(A)$  define as probability of success A and

$P(A')$  probability of failure of A then

$$P(A) + P(A') = 1$$

or

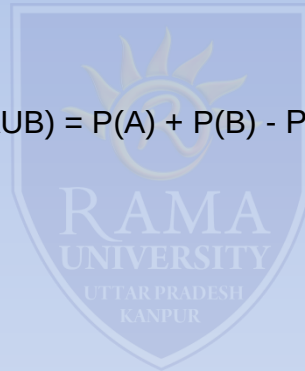
$$P(A') = 1 - P(A)$$

## Addition & Multiplication Theorem of Probability

- Let A and B are two events then

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

this is called addition theorem of probability.



- Let A and B are two events then

$$P(A / B) \cdot P(B) = P(A \cap B)$$

this is called multiplication theorem of probability.

# Suggested Readings & References

## Suggested Readings & References

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- 1) Statistical Methods: P.N. Arora, Sumeet Arora & S. Arora; S. Chand & Company Ltd.
- 2) Fundamental of Mathematical Statistics: S.C. Gupta & V. Kapoor; Sultan Chand & Sons.
- 3) Statistics: M.R. Spiegel; Schaum's Outline Series, Mc-Graw Hill Publication.
- 4) Advanced Engineering Mathematics: Erwin Kreyszig; John Wiley & Sons Inc.
- 5) Elements of Statistics: J.P. Chauhan & S. Kumar; Krishna Publication.

The logo of Rama University is a shield-shaped emblem. It features a stylized sun with rays at the top, a large letter 'R' in the center, and the words 'RAMA UNIVERSITY' below it.

**\* THANK YOU \***