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## FACULTY OF ENGINEERING & TECHNOLOGY

Dr. Vinod Kumar Yadav  
Assistant Professor in Mathematics  
Rama University Uttar Pradesh, Kanpur

# LECTURE- 19

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



Dr. Vinod Kumar Yadav  
Assistant Professor in Mathematics  
Rama University Uttar Pradesh, Kanpur

# Outline of Lecture

## Outline of lecture

- Binomial Distribution
- Introduction
- Definition & Formula
- Properties of Binomial Distribution
- Applications of Binomial Distribution
- Suggested Readings & References



## Introduction & Definition

- Binomial distribution was discovered by Swiss Mathematician Bernoulli in 1700.
- Let  $X$  is a random variable,  $n$  is a total number of trials,  $p$  is a probability of success and  $q$  is the probability of failure then,

$$p + q = 1 \text{ and}$$

$$P(X=r) = P(r) =$$

$${}^n C_r p^r q^{n-r}$$

where,

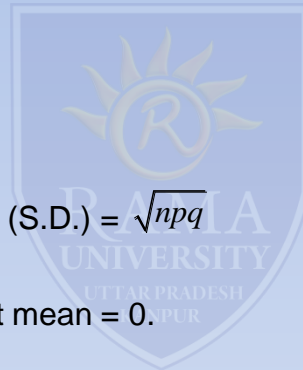
$$r = 0, 1, 2, 3, 4, \dots, n.$$

$P(r)$  = probability of event will happen exactly  $r$  times.

This is called Binomial distribution.

## Properties of Binomial distribution

- In binomial distribution there are two parameters  $p, n$  or  $q, n$ .
- In binomial distribution, mean =  $np$
- In binomial distribution, variance =  $npq$ .
- In binomial distribution standard deviation (S.D.) =  $\sqrt{npq}$
- In binomial distribution first moment about mean = 0.
- For symmetrical binomial distribution,  $p = q = \frac{1}{2}$
- In binomial distribution, always mean > variance.



## Application or uses of Binomial distribution

- It is used in tossing of a coin, throwing of die questions.
- It is used in RADAR detection.
- It is used in reliability of system.
- It is used in number of round fired from a gun hitting a target.
- It is used in problems concerning number of defectives in a sample production in bulb, tube light, etc industries.



# Suggested Readings & References

## Suggested Readings & References

- 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. At the top is a sun with rays, and in the center is a stylized letter 'R'. Below the shield, the words 'RAMA UNIVERSITY' are written in a serif font.

**\* THANK YOU \***