

**SRI VENKATESWARA UNIVERSITY : TIRUPATI****STATISTICS SYLLABUS ( I YEAR)****W.E.F. 2015-16****Semester – II** (CBCS With Maths Combination Common to BA/BSc)**Paper – II : Mathematical Expectation and Probability Distributions**

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**UNIT - I**

**Mathematical Expectation:** Mathematical expectation of a function of a random variable. Raw and central moments and covariance using mathematical expectation and properties with simple problems. Addition and multiplication theorems on expectation. Definition of moment generating function (m.g.f), cumulant generating function (c.g.f), characteristic function (c.f), probability generating function (p.g.f) and their properties with proofs, applications. Chebyshev's , and Cauchy-Schwartz's inequalities and their applications

**UNIT - II**

**Discrete distributions:** Bernoulli, Binomial, Poisson, Negative binomial distributions . Properties of these distributions such as mean, variance, mode, recurrence relationship, m.g.f , c.f., c.g.f., p.g.f , Reproductive property and their limiting cases(whenever exists) and their real life applications.

**UNIT - III**

**Geometric Distribution:** Mean, variance , m.g.f ., c.f., and Lack of Memory, Hyper-geometric distribution: Mean, variance , m.g.f ., c.f., limiting case of Hyper-geometric and their real life applications.

**UNIT – IV**

**Continuous distributions:** Rectangular, Exponential, Gamma distributions and Properties of these distributions such as mean, variance, m.g.f., c.f., Mean deviation about mean of Rectangular distribution, Lack of memory of exponential distribution, Beta of two kinds (mean and variance only) their real life applications.

**UNIT - V**

**Normal distributions:** Definition, properties such as mean, median, mode, variance, m.g.f., c.f., c.g.f., Odd and even order Moments, Mean deviation about mean, Additive - Reproductive Property, Area property, Q.D,M.D,S.D are approximately 10:12:15, and its importance., Normal distribution as a limiting case of Binomial and Poisson distributions. Cauchy distribution : Definition and c.f. only).

## Reference Books:

1. Fundamentals of mathematical statistics: S.C.Guptha and V.K. Kapoor
2. Outlines of statistics, Vol II: Goon Guptha, M.K.Guptha and Das Guptha B
3. Introduction to mathematical Statistics : Hoel P.G
4. Random variable and Probability Distribution: BA/BSc I year statistics- Telugu Academy
5. Statistics Made simple Do it yourself on PC By K.V.S. Sarma
6. Applied Statistics with Microsoft Excel By Gerald Keller.

## Practical Paper – II : Mathematical Expectation and Probability Distributions

1. Fitting of Binomial distribution and calculate expected frequencies (Direct method)
2. Fitting of Binomial distribution and calculate expected frequencies (Recurrence relation method)
3. Fitting of Poisson distribution and calculate expected frequencies (Direct method)
4. Fitting of Poisson distribution and calculate expected frequencies (Recurrence relation method)
5. Fitting of Negative Binomial distribution and calculate expected frequencies (Direct method)
6. Fitting of Negative B. D and calculate expected frequencies (Recurrence relation method)
7. Fitting of Geometric distribution and calculate expected frequencies ( Direct method)
8. Fitting of Geometric distribution and calculate expected frequencies (Recurrence relation method)
9. Fitting of Normal distribution and calculate expected frequencies (Area method)
10. Fitting of Normal distribution and calculate expected frequencies (Ordinates method)
11. Fitting of Exponential distribution and calculate expected frequencies( Direct method)
12. Fitting of Cauchy distribution and calculate expected frequencies

**Note :** The above practical are to be done using M S Excel and SPSS Package where ever it is possible

THREE YEAR B.A. / B.Sc DEGREE EXAMINATION  
**CBCS - SECOND SEMESTER**  
Part - II - STATISTICS (WM)  
Paper II : Mathematical Expectation & Probability Distributions  
(New syllabus w.e.f. 2015 – 16)

MODEL PAPER

Time : 3 Hours

Max Marks : 75

PART - A

**Answer any five of the following questions. Each question carries 5 marks      5x5 = 25 Marks**

1. Define mathematical expectation. Write the properties of mathematical expectations.
2. Define moment generating function and state its properties.
3. Define Bernoulli distribution and find its mean and variance
4. State and prove Cauchy Schwartz Inequality.
5. Find m.g.f of Poisson Distribution
6. Show that mean is less than variance in negative binomial distribution.
7. In normal distribution show that Q.D., M.D., & S.D. are approximately 10:12:15.
8. Define Cauchy distribution. Find its characteristic function.

**PART - B**

Answer **ONE** question from each unit. Each question carries 10 marks.

**5x10 = 50 Marks**

**UNIT - I**

9. Define characteristic functions and state and prove its properties.  
(OR)
10. State and prove addition theorem of mathematical expectation.

**UNIT – II**

11. Define poisson distribution and derive poisson distribution as a limiting form of Binomial Distribution.  
(OR)
12. Derive the recurrence relation formula for moments of Binomial Distribution.

**UNIT – III**

13. State and prove memory less property of geometric distribution.  
(OR)
14. Find mean and variance of Hyper geometric distribution.

**UNIT - IV**

15. Define Exponential distribution. Find its mean and variance.  
(OR)
16. Define Beta distribution of first kind. Find its mean and variance.

**UNIT - V**

17. Define Normal Distribution. State the properties of Normal Distribution.  
(OR)
18. Derive Normal Distribution as a limiting case of poisson distribution.