SEMESTER I

ALLIED – I : PAPER – I

MATHEMATICAL STATISTICS – I

Instructional Hrs. : 105 **Sub.Code : 16MCUA101**

Max.Marks: CIA – 25; ESE – 75 **Credits : 5**

Objective:

- To study about the random variables.
- The students will be able to apply statistical tools in real life problems as well as in research.
- The contents of this paper is a prerequisite for learning SPSS package.

UNIT I **21 Hrs.**

Random Variables : Random Variable – Cumulative Distribution Function – Continuous Random Variable – Two Dimensional Random Variable – Marginal Probability Distribution – Conditional Probability Distribution – *Independent Random Variables.*

UNIT II **21 Hrs.**

Characteristics of Distributions : Expectation or Mean Value – Function of a Random Variable – Properties of Expected Values. Variability (or dispersion) – *Properties of Variance* – Sample Mean and Sample Variance – Mean and Standard Deviation of the Combination of Two samples – Frequency Table – Tchebchev's Inequality.

UNIT III **21 Hrs.**

Characteristics of Distributions : Moments – Moment Generating Function – Measures of Location - Measures of Dispersion – Skewness – Kurtosis – Covariance – Sample Correlation Coefficient - Correlation for a Grouped Data – *Rank Correlation.*

UNIT IV **21 Hrs.**

Least Square and Regression Analysis : Curve Fitting – Principle of Least Squares – Fitting a Straight Line – Fitting a Second Degree Polynomial – To Fit a Curve of the form $y = ae^{bx}$, $y = ab^{x}$, $y = ax^{b}$- Regression of First Kind – Regression of Second Kind – Scatter Diagram – Lines of Regression – *Regression Line of Y on X* – Properties of Regression Coefficient – Angle between the Regression Lines.

UNIT V **21 Hrs.**

Discrete Distribution and Continuous Distributions : *Binomial Distribution* – Poisson Distribution – Continuous Distribution : Normal Distribution – Rectangular Distribution(Uniform Distribution) – Exponential Distribution.

Note : Italics denotes Self Study Topics.

TEXT BOOK:

1. **S.Venkataraman, P.R.Vittal.,** *Mathematical Statisics,*1973.

Unit	Chapter	Sections	Page No
I	2	2.1, 2.2, 2.3,2.5,2.6, 2.7, 2.8	39-70
II	3	3.1, 3.2, 3.3, 3.4 - 3.8	73-110
III	3	3.9 - 3.19	111-157
IV	11	11.1 - 11.4, 11.7 - 11.14	379-405
V	4 & 5	4.1, 4.2, 5.1, 5.2, 5.3	163-198, 203-241

- Question Paper setters are asked to confine to the **above text book only.**

SEMESTER II

ALLIED – I : PAPER – II

MATHEMATICAL STATISTICS – II

Instructional Hrs. : 105 **Sub.Code : 16MCUA202**

Max.Marks : CIA – 25; ESE – 75 **Credits : 5**

Objective :

- To study about the Sampling distribution.
- The students will be able to apply statistical tools in real life problems as well as in research.
- The contents of this paper are a prerequisite for learning SPSS package.

UNIT I **21 Hrs.**

Sampling Distribution : χ^2 Distribution – *Students t Distribution* – Snedecor's F Distribution – Sampling Distribution – Sampling Distribution of Mean and Variance in Samples from a Normal Distribution – The Central Limit Theorem.

UNIT II **21 Hrs.**

Theory of Estimation : Introduction – Properties of Good Estimators – *Method of Moments* – Principle of Maximum Likelihood.

UNIT III **21 Hrs.**

Testing Hypothesis and Tests of Significance: General Method of Testing Hypothesis – Test of Significance based on the *normal*, t, F Distribution – Small Samples – Significance of the difference between the Variance of Two Samples.

UNIT IV **21 Hrs.**

Tests of Goodness of Fit : The Chi-Square Test of Hypothesis – Chi-Square Test of Goodness of Fit – *Application to Contingency Tables.*

UNIT V **21 Hrs.**

Sampling from Finite Populations: Random Sampling – Methods of Selection of a Random Sample – Estimates of the Mean and Variance of the Mean in Simple Random Sampling – Stratified Random Sampling – *Optimum Allocation* – Systematic Samples.

Note : Italics denotes Self Study Topics.

TEXT BOOK:

1. **S.Venkataraman, P.R.Vittal.,** *Mathematical Statisics,*1973.

Unit	Chapter	Sections	Page No
I	6	6.4, 6.5, 6.6, 6.7, 6.9	258-281, 283-285
II	7	7.1 - 7.4	291-312
III	9	9.1 - 9.4	328-357
IV	10	10.1, 10.2	358-378
V	12	12.1 - 12.6	406-432

- Question Paper setters are asked to confine to the **above text book only.**

SEMESTER - VI

PRACTICAL – MATHEMATICAL SOFTWARE

(MATLAB, SPSS & LATEX)

Instructional Hrs: 4 **Subject Code: 16MCUCP05**

Max.Marks: CIA- 40; ESE-60 **Credits :3**

MATLAB :

1. Write a program to find the following for the matrices
   (i) Sum (ii) Product (iii) Determinant (iv) Sum of the diagonal (v) 2nd row of the transpose.
2. Write a program to
   (i) Find the Eigen values, Eigen vectors & Inverse for a given matrix.
   (ii) Check whether the given matrix is orthogonal.
3. Write a program to find the solution of a given system of equations by LU Decomposition method.
4. Write a program to solve the given system of equations by using Gaussian Elimination method.
5. Write a program to find the value of
   (i) $Sin(x)$ and $Sinh(x)$ (ii) $Cos(x)$ and $Cosh(x)$ (iii) $tan(x)$ and $tanh(x)$ for $x = 0, \frac{\pi}{2}, \pi$
6. Write a program to find the zero of the function $x^2 - sinx$ at $x = \frac{\pi}{4}$
7. Write a program to evaluate the following (i) Single Integral (ii) Double Integral with finite limits.
8. Write a program to solve Lagrangian polynomial for the given data.

X:	3	7	9	10
Y:	168	120	72	63

9. Write a program to check whether the given function is (i) Continuous (ii) Differentiable (iii) Analytic .

SPSS:

10. Write a program to find the following for the numerical data
    (i) Mean (ii) Median (iii) Harmonic Mean (iv) Geometric Mean (v) Variance and Standard Deviation.
11. Write a program to find the probability function by using
    (i) Binomial Distribution (ii) Poisson Distribution (iii) Normal Distribution.
12. Write a program to create a database, present the data through charts and diagrams and summarize the data using frequencies.
13. Write a program to apply T- test for an analysis of (i) One sample (ii) Independent samples (iii) Paired samples.
14. Write a program to analysis means of different variables by using one way ANOVA table.
15. Write a program to fit a (i) Straight line (ii) Exponential.

LATEX:

16. Type a Document in different ways(Left, Right, Center ,Justify) .
17. Type your own Bio-Data.
18. Draw a Table Structure.
19. Type a given Mathematical expression using Differentiation, Integration & Trigonometry.
20. Type a given Article.