Semester	Subject	Category	Lecture		Theory		Practical	Credits
	Code							
IV	21CPM	Core –	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	5
	A4B	Paper XIV	6	90	6	90		

# MATHEMATICAL STATISTICS

# **COURSE OBJECTIVES:**

The students will be able to

- Understand sampling theory, significance tests, estimation, testing of hypothesis, ANOVA and sequential analysis with rigorous mathematical treatment.
- Acquire knowledge on statistics and apply it to various physical problems
- Develop a thorough grasp of statistical methodology and apply statistical skills to solve real-life problems

# **COURSE OUTCOMES:**

On the successful completion of the course, the students will be able to

CO	CO Statement	Knowledge
Number		Level
		(K1-K4)
CO1	Understand the exact sampling distributions and solve statistical	K2
	problems which are used in the fields of scientific experimentation.	
CO2	Apply parametric test for small samples, test the independence of	K3
	attributes and test for randomness.	
CO3	Discuss various characteristics of estimators and illustrate different	K3
	methods of estimation	
CO4	Analyze the results for various experiments using one and two	K4
	factors of classification	
CO5	Construct the sequential probability in the ratio test, determine the	K3
	constants of A and B, test the hypothesis concerning P on 0-1	
	distribution, m in Normal distribution and obtain OC function.	

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

# MAPPING WITH PROGRAM OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	М	М	S	S
CO2	S	S	М	М	М	S
CO3	S	S	М	М	S	S
CO4	S	М	S	S	М	S
CO5	S	S	S	М	М	S

S- Strong; M - Medium; L - Low

### UNIT –I: SAMPLE MOMENTS AND THEIR FUNCTIONS:

Notion of a sample and a statistic – Distribution functions of  $\overline{X}$ , s<sup>2</sup> and [ $\overline{X}$ , s<sup>2</sup>] –  $\chi^2$  distribution – student t – distribution – Fisher's Z – distribution – Snedecor 's F – distribution – Distribution of sample mean from non – normal populations.

Chapter 9: Sections 9.1 to 9.8

### **UNIT – II: SIGNIFICANCE TEST:**

Concept of a Statistical test – parameteric tests for small samples and large samples –  $\chi^2$  test — the Wald –Wolfovitz and Wilcoxon – Mann – Whitney tests – independence tests by contingency tables.

**Chapter 12: Sections 12.1 to 12.7** 

## UNIT – III: ESTIMATION:

Preliminary notion – Consistency estimation – Unbiased estimates – Sufficiency – Efficiency – Asymptotically most efficient estimates – methods of finding estimates.

Chapter 13: Sections 13.1 to 13.8

## UNIT -- IV: ANALYSIS OF VARIANCE:

One way classification and two way classification-Hypothesis testing : Poser functions – OC function – Most powerful test – Uniformly most powerful test – unbiased test .

Chapter 15: Sections 15. 1 and 15. 2 (omit section 15. 3)

Chapter 16: Sections 16.1 to 16 .5. (Omit section 16.6 and 16.7)

### UNIT – V: SEQUENTIAL ANALYSIS:

SPRT –Auxiliary theorem – Wald's fundamental identity –OC function and SPRT.E(n) and determination of A and B .Testing of hypothesis concerning p on 0-1 distribution and m in Normal distribution.

Chapter 17: Sections 17.1 to 17.9 (omit section 17.10)

## **DISTRIBUTION OF MARKS: THEORY 90% AND PROBLEMS 10%**

**18 Hours** 

**18 Hours** 

## **18 Hours**

# 18 Hours

**18 Hours** 

# **TEXT BOOK**

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	MarekFisz	Probability Theory and Mathematical Statistics	John Wiley and sons, New York	1963

## **REFERENCE BOOKS**

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	E.J Dudewicz and S.N.Mishra	Modern Mathematical Statistics	John Wiley and sons, New York	1963
2.	V.K.Rohatgi	An introduction to Probability theory and Mathematical Statistics(3 <sup>rd</sup> edition)	Wiley Eastern ,New Delhi	1988
3.	G.G.Rousatt	A first course in Mathematical Statistics	Addision Wesley publishing company	1973
4.	B.L.Vanderwareden	Mathematical statistics	G. Allen &Unwin Ltd, London	1968

# WEB RESOURCES

- 1. www.researchgate.net/publication/272237355\_probability\_and\_mathematical\_statistics.pdf
- 2. http://www.math.louisville.edu/~pksaho01/teaching/Math662TB-09S.pdf

# **TEACHING METHODOLOGY**

- 1. Class room teaching
- 2. Giving Assignments for all units
- 3. Discussions
- 4. Home test
- 5. PPT presentation

# SYLLABUS DESIGNER

Dr.T.Ranjani, Assistant Professor of Mathematics.