

Statistics Paper – 5: Statistical Inferential Techniques for Decision (Major & Minor) (4 credit)
As per NEP 2020

To be implemented from the Academic year 2025-'26

Course code	MJSTC 505/MESTC 505	Weightage	Marks
Course title	Paper – 5: Statistical Inferential Techniques for Decision		
credit	4		
Teaching per week	4 hours		
Effective from	2025-'26		
Purpose of course	The Purpose of the course is to developed theoretical knowledge and practical applications so learners will develop the skills necessary for effective statistical analysis and interpretation		
Objective of course	The main objective of this course is to provide students with a comprehensive understanding of hypothesis testing and small sample test. Additionally, the course introduces students to Indian official statistics, including the roles of key organizations such as the Central Statistical Organization, National Sample Survey, and Indian Statistical Institute.		
Programme Outcomes	<p>PO-01: Knowledge & Conceptual Understanding: Develop a strong foundation in principles and concepts across disciplines, fostering interdisciplinary learning, advance knowledge and problem-solving abilities.</p> <p>PO-02: Analytical & Critical Thinking: Apply critical thinking and analytical reasoning to evaluate data, hypotheses and real-world problems, leading to evidence-based conclusions.</p> <p>PO-03: Research & Inquiry-based Learning: Develop investigative skills through experimentation, data analysis to contribute to research and innovation.</p> <p>PO-04: Technical Skills: Gain hands-on experience with instrumentation and computational tools relevant to research and industry applications.</p> <p>PO-05: Digital & Computational Literacy: Utilize digital tools, computational techniques and emerging technologies such as AI, statistical modelling to enhance learning and problem-solving.</p> <p>PO-06: Environmental & Societal Responsibility: Understand the role of science in addressing environmental, health and societal challenges, promoting sustainability and ethical responsibility.</p> <p>PO-07: Effective Communication & Collaboration: Develop proficiency in scientific communication, both written and oral, for-effective dissemination of knowledge while collaborating in multidisciplinary teams.</p> <p>PO-08: Innovation & Entrepreneurship: Foster an entrepreneurial mind-set by applying knowledge for innovation, technology development, and industry-oriented applications. Develop sustainable solutions to address real-world challenges in research and environmental management.</p> <p>PO-09: Lifelong Learning & Professional Growth: Cultivate curiosity and adaptability for continuous learning, equipping students for higher education,</p>		

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Course outcomes	CO1: Understand the basic concept of testing of hypothesis. CO2: Understand the basic concept of small sample test. CO3: Understand the basic concept of F-distribution & Analysis of Variance and concept of Fisher's Z transformation. CO4: Apply the course content for the further study of statistics and Acquire Knowledge about Indian official statistics.										
Mapping between COs with PSOs	CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
	CO1	✓			✓		✓	✓			
	CO2	✓			✓		✓	✓			
	CO3	✓			✓	✓	✓	✓	✓		
	CO4	✓	✓	✓	✓	✓	✓	✓	✓		
Course content	Unit-I: Testing of hypothesis: <ul style="list-style-type: none"> Statistical hypothesis (Simple & Composite) Test of a statistical hypothesis Null and Alternative hypothesis Critical region Two types of errors Level of significance and power of the test 									10%	05
	Unit-II: Small Sample test: Test based on χ^2, t and F distributions: <ul style="list-style-type: none"> Test of population variance Test of goodness of fit Test of independence of attributes Yate's correction Test of single mean Test of difference between two means (for dependent and independent samples) Test of significance of sample correlation coefficient. Confidence intervals for mean and variance for small samples. Fisher's Z-transformation: <ul style="list-style-type: none"> Fisher's Z-transformation and its application Test of two population variances. 									50%	25
	Unit-III Analysis of variance: <ul style="list-style-type: none"> One way classifications two way classifications 									20%	10
	Unit-IV: Indian official statistics: <ul style="list-style-type: none"> Central Statistical Organization on (CSO) National Sample Survey (NSS) National Council of Applied Economics and Research Department of Commercial Intelligence and Statistics (D.C.I.S) Indian Statistical Institution (I.S.I) Principal Publications containing data on the topics such as population, agriculture and industry. 									20%	10
References	<ol style="list-style-type: none"> Goon A.M., Gupta M. K. & Dasgupta (1986): Fundamentals of Statistics Vol-II; Worls Press: Culcutta. Gupta S. C. & Kapoor V. K. : Fundamentals of Mathematical Statistics; Sultan Chand & Sons. George Casella & Roger L. Berger (2024) : Statistical Inference; CRC Press: Taylor & Francis Group Unit I: Testing of Hypothesis Title: Statistical Inference										

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