

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

T.Y.B.COM SEM -VI

Statistics Paper – 7: Statistical Analytical Methods (Major/ Minor) (4 credit)

As per NEP 2020

To be implemented from the Academic year 2025-'26

Course code	MJSTC 607/MESTC 607	Weightage	Marks
Course title	Paper -- 7: Statistical Analytical Methods		
credit	4		
Teaching per week	4 hours		
Effective from	2025-'26		
Purpose of course	The purpose of the course is to developed practical applications and theoretical knowledge, learners will develop essential skills for statistical analysis in social sciences and economics		
Objective of course	The main objective of this course is to provide students with a foundational understanding of non-parametric tests. The purpose is to make students aware about the application of demography in social science and additionally, the course explores the concept of national income, its estimation methods, and income distribution using the Lorenz curve and Pareto's law.		
Programme outcomes	PO-01: Knowledge & Conceptual Understanding: Develop a strong foundation in principles and concepts across disciplines, fostering interdisciplinary learning, advance knowledge and problem-solving abilities. PO-02: Analytical & Critical Thinking: Apply critical thinking and analytical reasoning to evaluate data, hypotheses and real-world problems, leading to evidence-based conclusions. PO-03: Research & Inquiry-based Learning: Develop investigative skills through experimentation, data analysis to contribute to research and innovation. PO-04: Technical Skills: Gain hands-on experience with instrumentation and computational tools relevant to research and industry applications. PO-05: Digital & Computational Literacy: Utilize digital tools, computational techniques and emerging technologies such as AI, statistical modelling to enhance learning and problem-solving. PO-06: Environmental & Societal Responsibility: Understand the role of science in addressing environmental, health and societal challenges, promoting sustainability and ethical responsibility. PO-07: Effective Communication & Collaboration: Develop proficiency in scientific communication, both written and oral, for effective dissemination of knowledge while collaborating in multidisciplinary teams. 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. PO-09: Lifelong Learning & Professional Growth: Cultivate curiosity and		

	adaptability for continuous learning, equipping students for higher education, research, and professional careers. PO-10: Ethical Leadership & Value-based Education: Develop leadership qualities, ethical values, and a sense of responsibility in applying societal progress, aligning with Indian knowledge systems and global perspectives.											
Programme specific outcomes	PSO1: Understanding Statistical Principles Graduate Should comprehend the importance and value of statistical principles and be able to convert problem description into testable research hypothesis. PSO2: Professional and Entrepreneurial Skills Development The program enhances student's professional skills and entrepreneurial capabilities, fostering independent logical and analytical thinking. It also emphasizes teamwork and leadership, preparing students for diverse environments by providing skill enhancement Certificate courses. PSO3: Real-World Problem Solving Students are trained to investigate, design, and develop practical solutions for real-world challenges, ensuring they can apply theoretical knowledge to practical situations through Experiential Learning and by providing platform for extracurricular activities. PSO4: Self-Learning and Problem-Solving Skills Students gain hands-on experience with advanced statistical tools and software, enhancing their ability to tackle real-world problems efficiently. PSO5: Performing data Analysis Graduate should be able to apply analytical and statistical methods to analyze data, interpret results, and provide solutions in various settings. PSO6: Develop Communication Skills Effectively Communicate Statistical results through clear & informative data visualizations. PSO7: Commitment to Lifelong Learning and Research The program focuses not only on imparting core education but also to developing interest in research. PSO8: Provide Employability Identify & explore career opportunities in statistics, including roles in industry, government & academia.											
Mapping between POs and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8			
	PO1	✓		✓		✓						
	PO2	✓	✓	✓	✓	✓						
	PO3	✓		✓				✓				
	PO4			✓	✓	✓		✓				
	PO5	✓		✓	✓	✓						
	PO6	✓		✓		✓				✓		
	PO7		✓	✓			✓					
	PO8	✓	✓							✓		
	PO9			✓	✓	✓		✓	✓			
	PO10		✓	✓			✓					
Course outcomes	CO1: Understand the basic concept of Non parametric inference.											

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	CO2: Understand the basic concept of demography. CO3: Understand the concept of mortality. CO4: Understand the concept of national income and apply the course content for the further study of statistics.										
Mapping between COs with PSOs	CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
	CO1	✓			✓		✓				
	CO2	✓			✓		✓	✓			
	CO3	✓			✓	✓	✓				
	CO4	✓		✓	✓	✓	✓	✓	✓		
Course content	Unit-I: Non parametric tests: • Introduction • Comparison of parametric and non-parametric tests • Sign test for single sample and paired samples • Wilcoxon signed-rank test for one sample and paired samples • Mann-Whitney test • Median test.									40%	20
	Unit-II: Demography: • Meaning • Uses • Methods of collecting demographic statistics • Defects of demographic statistics • Mortality and Fertility: ○ Infant mortality ○ Neonatal mortality ○ Maternal mortality ○ Death rates ○ Standardized death rates									20%	10
	Unit-III: Fertility and Reproduction: • Crude Birth Rate (CBR) • General Fertility Rate (GFR) • Age specific fertility rate • Total Fertility Rate (TFR) • Gross Reproduction Rate (GRR) • Net Reproduction Rate (NRR)									20%	10
	Unit-IV: National Income: • Concept of National Income • Uses • Methods of its estimation • Lorenz curve and Pareto's law of Income distribution ○ Concept ○ Derivations and Applications.									20%	10
References	1. Goon A.M., Gupta M. K. & Dasgupta B. : Fundamentals of Statistics Vol-II; Wors Press: Kolkata 1991. 2. Gibbons J.E. : Non-Parametric Methods, McGraw Hills. 3. Barkley G.W/(1958): "Techniques of population analysis" John Wiley & Sons Inc First Ed. 4. Pathak, K.B. and F. Ram (1998): "Techniques of Demography										

Page 11

	Analysis" 2nd Ed, Himalaya Pub. House, Delhi. 5. Cox P.R : "Demography" Cambridge University Press. 6. Srivastava, O.S.(1983): A Texbook of Demography; Vikas Publishing House. 7. Dr. Ashwini M. Kapadiya (2016): "Population Education"; Amol prakashan. Jaiswal, M. C. (1984) : Arth Vishayakankadashashtra (in Gujarati); University Granth Nirman Board, Ahmedabad.		

MPM 7

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

T.Y.B.COM SEM –VI

Statistics Paper – VIII: Data Collection Techniques in Ancient India and Vedic Mathematics

(Major Paper-VIII) (4 credit)

As per NEP 2020

To be implemented from the Academic year 2025-'26

Course code	MJSTC-BGP-608	Weightage	Marks
Course title	Statistics Paper – VIII: Data Collection Techniques in Ancient India and Vedic Mathematics		
credit	4		
Teaching per week	4hours		
Effective from	2025-'26		
Purpose of course	The purpose of this course is to provide students with an understanding of the origins and development of data collection and record-keeping practices in ancient India.		
Objective of course	The main objective of this course is to help students explore the rich traditions of data collection and record-keeping in ancient India, including both formal and informal systems. Students will understand how demographic records were maintained using various indigenous methods and analyze how these early practices connect to and influence modern data collection techniques. Through historical examples and comparisons, students will gain a deeper appreciation of India's contributions to data management and its relevance in today's world.		
Programme outcomes	PO-01: Knowledge & Conceptual Understanding: Develop a strong foundation in principle and concepts across disciplines, fostering interdisciplinary learning, advance knowledge and problem-solving abilities. PO-02: Analytical & Critical Thinking: Apply critical thinking and analytical reasoning to evaluate data, hypotheses and real-world problems, leading to evidence-based conclusions. PO-03: Research & Inquiry-based Learning: Develop investigative skills through experimentation, data analysis to contribute to research and innovation. PO-04: Technical Skills: Gain hands-on experience with instrumentation and computational tools relevant to research and industry applications. PO-05: Digital & Computational Literacy: Utilize digital tools, computational techniques and emerging technologies such as AI, statistical modelling to enhance learning and problem-solving. PO-06: Environmental & Societal Responsibility: Understand the role of science in addressing environmental, health and societal challenges, promoting sustainability and ethical responsibility. PO-07: Effective Communication & Collaboration: Develop proficiency in scientific communication, both written and oral, for effective dissemination of knowledge while collaborating in multidisciplinary teams. PO-08: Innovation & Entrepreneurship: Foster an entrepreneurial mind-set by applying knowledge for innovation, technology development, and		

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	industry-oriented applications. Develop sustainable solutions to address real-world challenges in research and environmental management. PO-09: Lifelong Learning & Professional Growth: Cultivate curiosity and adaptability for continuous learning, equipping students for higher education, research, and professional careers. PO-10: Ethical Leadership & Value-based Education: Develop leadership qualities, ethical values, and a sense of responsibility in applying societal progress, aligning with Indian knowledge systems and global perspectives.																																																																																			
Programme specific outcomes	PSO1: Understanding Statistical Principles Graduate Should comprehend the importance and value of statistical principles and be able to convert problem description into testable research hypothesis. PSO2: Professional and Entrepreneurial Skills Development The program enhances student's professional skills and entrepreneurial capabilities, fostering independent logical and analytical thinking. It also emphasizes teamwork and leadership, preparing students for diverse environments by providing skill enhancement Certificate courses. PSO3: Real-World Problem Solving Students are trained to investigate, design, and develop practical solutions for real-world challenges, ensuring they can apply theoretical knowledge to practical situations through Experiential Learning and by providing platform for extracurricular activities. PSO4: Self-Learning and Problem-Solving Skills Students gain hands-on experience with advanced statistical tools and software, enhancing their ability to tackle real-world problems efficiently. PSO5: Performing data Analysis Graduate should be able to apply analytical and statistical methods to analyze data, interpret results, and provide solutions in various settings. PSO6: Develop Communication Skills Effectively Communicate Statistical results through clear & informative data visualizations. PSO7: Commitment to Lifelong Learning and Research The program focuses not only on imparting core education but also to developing interest in research. PSO8: Provide Employability Identify & explore career opportunities in statistics, including roles in industry, government & academia.																																																																																			
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Course outcomes	CO1: Students will understand the formal and informal systems of data collection and record-keeping in ancient India. CO2: Students will understand how people kept demographic and administrative records. CO3: Students will know about King Todar Mal's contributions to data and revenue systems. CO4: Students will relate ancient data practices to modern data collection techniques. CO5: Students will get a basic idea of Vedic Mathematics and how it is useful today.																																																																		
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CO5	✓	✓		✓		✓		✓																																																											
Course content	Unit-I: Data collection in ancient India ➤ Formal and Informal Systems of Data Recording in Ancient India ➤ How Demographic Records keep in Ancient India											20%	10																																																						
	Unit-II: Data collection methods in ancient India ➤ Different methods use to keep records in ancient india ➤ Linking Ancient and Modern Data Collection Methods											10%	5																																																						
	Unit-III: King Todar Mal ➤ Early life of King Todar Mal ➤ Early career under Sher Shah Suri ➤ Service under Emperor Akbar ➤ Revenue Reforms and Administrative Achievements ➤ Record keeping and Local administration											20%	10																																																						
	Unit-IV: Introduction to Vedic Mathematics ➤ Origin and history (Attributed to Jagadguru Shri Bharati Krishna Tirthaji Maharaj) ➤ Importance and applications in modern times ➤ 16 Sutras and 13 Sub-Sutras (only basic idea, not all in-depth)											50%	25																																																						
References	1. "A History of India" – Romila Thapar (Good for understanding early Indian society, administration, and record-keeping.) 2. "The Wonder That Was India" – A.L. Basham (Covers ancient Indian social, political, and administrative systems.) 3. "Ancient Indian History and Civilization" – Sailendra Nath Sen (Useful for methods of data recording and demographic practices.) 4. "Indian Administration" – M.V. Pylee (Background on early administrative practices and evolution.) 5. "Akbar and His India" – Irfan Habib (coverage of Akbar's administration, including Todar Mal's revenue reforms.)																																																																		

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| | <ol style="list-style-type: none">6. "The Mughal Empire" (Volume 1 of The New Cambridge History of India) – John F. Richards
(for Todar Mal's career under Akbar and general Mughal record systems.)7. "Medieval India: From Sultanat to the Mughals" – Satish Chandra
(Covers Sher Shah Suri's and Akbar's administrative and revenue systems.)8. "Vedic Mathematics" – Jagadguru Shri Bharati Krishna Tirthaji Maharaj
(The original classic text — must refer.)9. "Vedic Mathematics Made Easy" – Dhaval Bathia
(Simplified approach for beginners, very practical.)10. "Speed Mathematics Using Vedic Sutras" – Dr. Aditi Singhal
(Modern applications of Vedic techniques, suitable for practice.)11. "India's Ancient Past" – R.S. Sharma
(Background for general ancient Indian society and culture.)12. Administrative System of the East India Company – B.B. Mishra
(comparison when linking ancient and modern administrative ideas.) | | |
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