M.A./ M.Sc. (Two Year Degree Program)	
Fourth Semester	
Subject - Geography	
Code of the Course	GEG9116T
Title of the Course	Quantitative Methods in Geography
Qualification Level of the Course	NHEQFLevel6.5
Credit of the course	4
Type of the course	Discipline Specific Elective Course in Geography
Delivery type of the course	Lecture (40+20=60). The 40 Hours for content delivery and 20 hours of diagnostic assessment, formative assessment and subject/class activity, problem solving.
Prerequisites	Fundamental understanding of geographical concepts & phenomena.
Co- requisites	None
Objective of the Course	This is the basic course and sub discipline of Geography, which provides various methods of statistics for data analysis.
Learning outcomes	• It includes the methods of data presentation in a graphical manner and also introduces the measures of central tendency. • It deals with the measures of deviation and variation. It also reveals the measures of diversion from normality. • It discusses the basic concept of normal distribution and statistical significance testing. • It elaborates the measures of distribution and also deals with methods of concentration. • It has been dedicated to the statistical methods of hypothesis testing.
Syllabus **पाठ्यक्रम**	

UNIT-I	Significance & utilization of quantitative methods in geography. Graphical presentation of data: Histogram, Polygon, Cumulative frequency curve (Ogive). Measures of central tendency: Median & Mean and Mode.
	भूगोल में मात्रात्मक विधियों का महत्व एवं उपयोग। आंकड़ों के आरेखी प्रदर्शन: आयत चित्र, आवृति बहुभुज, संचयी आवृति वक्र(ओजाइव)। केंद्रीय प्रवृत्ति के माप: मध्यमान, माध्यिका ,बहुलक ।
UNIT-II	Measures of dispersion/deviation: Mean deviation, standard deviation, variance and Coefficient of variation. Diversion from normality: Skewness & Kurtosis.
	विचलन के माप : मध्यमान विचलन, प्रमाप विचलन, प्रसरण तथा विचरण गुणांक । प्रसामान्यता से विचलन: विकृति एवं पृथुशीर्षत्व।
UNIT-III	Normal Probability Curve: Meaning, importance, application (Computing Z Scores, Convert percentage, Limits, Finding the total area above & below a score, between two scores); One tailed and two tailed tests.
	सामान्य संभावना वक्र: अर्थ, महत्व, उपयोग (Z-अंको का आकलन, प्रतिशत में रूपांतरण, सीमाएं, दो अंकों के मध्य क्षेत्रफल का आकलन, अंको से पूर्व एवं पश्चात के क्षेत्रफल का आकलन)।एक पुच्छ तथा द्वी पुच्छ परीक्षण ।
UNIT-IV	Gini coefficient of concentration and Lorenz Curve. Correlation- Carl Pearson correlation & Spearman's rank correlation. Linear regression analysis & Factor Analysis. Introduction of multivariate statistics.
	संकेन्द्रण का गिनी गुणांक तथा लोरेन्ज वक्र । सहसम्बन्ध: कार्ल पीयर्सन तथा स्पीयरमैन की स्थानक्रम विधि। रेखीय प्रतीपगमन विश्लेषण तथा घात विश्लेषण । बहुचर सांख्यिकी का परिचय ।
UNIT-V	Steps of Hypothesis testing. Tests of statistical significance: T-test, F-test, Chi-Square test, Analysis of Variance.
	परिकल्पना परीक्षण के चरण. सांख्यिकीय महत्व के परीक्षण: टी-परीक्षण, एफ-परीक्षण, काई वर्ग परीक्षण, प्रसरण विश्लेषण।
	Suggested Readings **सहायकग्रन्थ / सामग्री**
Text Books	1. Bhandarkar, P.L. & Wilkinson, T.S., Methodology and Techniques of Social Research. Himalaya Publishing House, Mumbai, 2016.
	2.Cole, J. P. And C. M. A. King, Quantitative Geography: Techniques and Theories in Geography, John Willey and Sons Ltd., London, 1970.
	3.Garg.B.L., Karadia, R., Agarwal,F. and Agarwal, U.K., An introduction to Research Methodology, RBSA Publishers, 2002.
	4. Kothari, C.R., Research Methodology: Methods and Techniques, Second Edition. New Age International Publishers, New Delhi.
	5. Nagar, Kailashnath: Basic Elements of Statistics, Meenaxi

	Publications, 2017.
	6. Pani, Prabhat Kumar, Research Methodology: Principles and Practices, S. K. Book Agency, New Delhi, 2015.
	7. Sharma, K. R., Research Methodology, National Publishing House, Jaipur, 2017.
	8. Sinha, S.C. and Dhiman, A.K., Research Methodology, Ess Ess Publications, 2002.
	9. कैलाश नाथ नागर, सांख्यिकी के मूल तत्व, मीनाक्षी प्रकाशन, 2017
	10. डॉ. पी. एम शर्मा, भूगोल में सांख्यिकी विधियां, राजस्थान हिन्दी ग्रंथ अकादमी, 2021
	11. सत्य प्रकाश सिंह एवं संजीव कुमार सिंह, सांख्यिकी भूगोल, ASR प्रकाशन, 2017
	12. देवेश कौशिक, सांख्यिकी भूगोल, अर्जुन पब्लिशिंग हाउस, 2018
Reference Books	1.Chou, Ya-Lun, Statistical Analysis: With Business and Economics Application, Holt, Rinehart and Winston, New York, 1975.
	2. Gregory, S., Statistical Method and the Geographer, Longman Group Ltd. London, 1978.
	3. Hammond, Robert and Patrick McCullagh, Quantitative Techniques in Geography: An Introduction, Oxford University Press, London, 1978.
	4. Johnston, R. J., Multivariate Statistical Analysis in Geography, Longman Group Ltd. London, 1978.
	5. Silk, J., Statistical Concept in Geography, George Allen and Unwin, London, 1980.
	6. Wilson, A. H. And M. J. Kirkby, Mathematics for Geographers and Planners, Oxford University Press London 1982.
Suggested E-resources	