M.A./M.Sc. (Two Years Degree Program)	
Third Semester	
Subject-Geography	
Code of the Course	GEG9105P
Title of the Course	DATUM & PROJECTIONS
Qualification Level of the Course	NHEQF Level 6.5
Credit of the course	4
Type of the course	Discipline Specific Elective Course in Geography
Delivery type of the Course	Practical (80+40). The 80 hours for content delivery include hands-on exercises, and 40 hours of diagnostic assessment, formative assessment, and subject/class activity, problem solving.
Prerequisites	This course on the Datum & Projection assumes' that the students are familiar with the basic concepts of projections of Graduation level.
Co-requisites	Basic knowledge of Cartography
Objectives of the course	• To give an understanding of Cartographic techniques. • To give an overview of concept of datum, projection and classification of projections. • To give an overview of Graphical & Mathematical construction the projection.
Learning outcomes	• Knowledge and understanding of datum and projection. • Knowledge and understanding of map projection, classification of projections, parallels and meridians. • Knowledge and understanding of Graphical & Mathematical construction of the various projections.
Syllabus **पाठ्यक्रम**	
UNIT - I	Concept of Geoid and Ellipsoid. Horizontal and Vertical datums. Local and Geocentric datums. WGS84 datum. Geographic Coordinate System. New Map Policy of India. पृथ्व्याकार और दीर्घवृताभ की संकल्पना। क्षैतिज एवं ऊर्ध्वाधर डेटम। स्थानिक एवं भूकेन्द्रित डेटम। डब्ल्यूजीएस84 डेटम। भौगोलिक निर्देशांक प्रणाली। भारत की नई मानचित्र नीति।

UNIT - II	Map Projection: Meaning and Definition, Necessity of map projection, Latitude and parallels, Longitude and meridians, Classification of projections. मानचित्र प्रक्षेपः अर्थ एवं परिभाषा, मानचित्र प्रक्षेप की आवश्यकता, अक्षांश एवं अक्षांश रेखाएं, देशान्तर एवं देशान्तर रेखाएं, प्रक्षेपों का वर्गीकरण।
UNIT - III	Graphical & mathematical construction of conical projections- two standard parallel, Bonne's and Polyconic. Merit, limitations and utility of each projection. *6 Exercises* आलेखी एवं गणितीय विधि द्वारा शंकु प्रक्षेपों की रचना– दो मानक अक्षांश, बॉन एवं बहु शंकुक प्रक्षेप। प्रत्येक प्रक्षेप के गुण, दोष एवं उपयोगिता। *6 अभ्यास*
UNIT - IV	Graphical & mathematical construction of cylindrical projections – Equidistance, Equal Area, Mercator's- Great circle and Loxodrome, UTM projection. Merit, limitations and utility of each projection. *8 Exercises* आलेखी एवं गणितीय विधि द्वारा बेलनाकार प्रक्षेपों की रचना–समदूरस्थ, सम क्षेत्र, मर्केटर प्रक्षेप–वृहत वृत्त एवं एकदिश नौपथ रेखा, यूटीएम प्रक्षेप। प्रत्येक प्रक्षेप के गुण, दोष एवं उपयोगिता। *8 अभ्यास*
UNIT - V	Graphical & mathematical construction of conventional projections – Gall's Stereographic and Mollweide's projection. Merit, limitations and utility of each projection. *4 Exercises* आलेखी एवं गणितीय विधि द्वारा रूढ़ प्रक्षेपों की रचना–गॉल का त्रिविम एवं मॉलवीड प्रक्षेप। प्रत्येक प्रक्षेप के गुण, दोष एवं उपयोगिता। *4 अभ्यास*
	Exercises **अभ्यास**
	1. Two standard parallel Projection by graphical method. 2. Two standard parallel Projection by mathematical method. 3. Bonne's Projection by graphical method. 4. Bonne's Projection by mathematical method. 5. Polyconic Projection by graphical method. 6. Polyconic Projection by mathematical method. 7. Equidistance Projection by graphical method. 8. Equidistance Projection by mathematical method. 9. Equal Area Projection by graphical method. 10. Equal Area Projection by mathematical method. 11. Mercator's Projection by graphical method. 12. Mercator's Projection by mathematical method. 13. UTM Projection by graphical method.

	14. UTM Projection by mathematical method. 15. Gall's Stereographic Projection by graphical method. 16. Gall's Stereographic Projection by mathematical method. 17. Mollweide's Projection by graphical method. 18. Mollweide's Projection by mathematical method.
	Suggested Readings **सहायक ग्रन्थ / सामग्री**
Text Books	• Singh, R. L., Singh, Rana B.P. Elements of Practical Geography, Kalyani Publishing. • Mishra, R. P. and A. Ramesh, Fundamentals of Cartography, Concept Publishers, New Delhi. • शर्मा, जे.पी., प्रयोगात्मक भूगोल, रस्तोगी पब्लिशर्स, मेरठ • मिश्रा, आर.एन., शर्मा, पी.के., प्रायोगिक भूगोल, रावत पब्लिकेशन, जयपुर • खुल्लर, डी.आर., प्रयोगात्मक भूगोल, कल्याणी पब्लिशर्स, नई दिल्ली
Reference Books	• Arthur G., Advance Practical Geography, Heinemann Educational Publishers. • Campbell, J., Introductory Cartography, Brown (William C.) Co., U.S. • Keates, J. S., Cartographic Design and Production, Longman, London. • Loxton, J., Practical Map Production, John Wiley & Sons, New York. • Monkhouse, F. J. and H. R. Wilkinson, Maps and Diagrams, Egmont Books Ltd. • Raisz, E., General Cartography, McGraw Hill Book Co., New York. • Robinson, A. H., Elements of Cartography, John Wiley & Sons.
Suggested E-resources	• https://www.maptoaster.com/maptoaster-topo-nz/articles/projection/datum-projection.html • https://www.icsm.gov.au/education/fundamentals-mapping/datums • https://ncert.nic.in/textbook/pdf/kegy304.pdf • https://www.britannica.com/science/Mercator-projection • https://www.e-education.psu.edu/geog160/node/1918 • https://www.icsm.gov.au/education/fundamentals-mapping/projections/commonly-used-map-projections • https://gisgeography.com/map-projections/