

M.A./M.Sc. (CBCS Program)	
First Semester	
Subject - Geography	
Code of the Course	GEG8000P
Title of the Course	REPRESENTATION OF RELIEF AND CLIMATIC DATA
Qualification Level of the Course	NHEQF Level 6.5
Credit of the course	4
Type of the course	Discipline Centric Core Practical 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	Understanding of geographical concepts relating to relief and climate. Basic knowledge of mathematics of secondary level.
Co- requisites	Basic cartographic skills.
Objective of the Course	This is the basic course and sub discipline of Geography, This paper includes the conceptualization of various basic aspects and representation of relief features and climatic data.
Learning outcomes	<ul style="list-style-type: none"> • It provides various quantitative and qualitative methods of relief representation. • It reveals the basic concepts of profiles and slope analysis and also introduces the geospatial modelling for relief features. • It discusses various concepts and methods for the analysis of drainage basins. • It represents various diagrams and graphs used in the representation of relief features and climatic data. • It introduces various weather symbols and isolines used on weather maps and discuss the interpretation of weather map. It also introduces various portals for climatic data and weather forecasting.

Syllabus पाठ्यक्रम	
UNIT-I	<p>Representation of relief: Introduction and importance. Methods of relief representations: Qualitative or Pictorial method: Hachure method, Hill shading method, Trachographic method, Morphographic method. Quantitative or Mathematical methods (Spot height, Bench mark, Trigonometric stations, Form lines and Contour lines (Principals of contouring, Interpolation of contour lines and Methods of contour representation) and Composite methods. Their characteristics, merits and demerits.</p> <p>उच्चावच निरूपण: परिचय और महत्व । उच्चावच निरूपण की विधियाँ; गुणात्मक / चित्रमय विधियाँ: हैश्युर प्रणाली, पर्वतीय छायाकरण, ट्रैकोग्राफीय विधि, आकृतिक विधि । उच्चावच निरूपण की मात्रात्मक / गणितीय विधियाँ : स्थानिक ऊचाईयाँ, तल चिन्ह, त्रिकोणमिति स्टेशन, आकृति रेखाए एवं समोच्च रेखाए; (समोच्च रेखाओं के सिद्धान्त ,समोच्च रेखाओं का अंतर्वेशन, सम्मोच रेखाओं के निरूपण की विधियां) । उच्चावच निरूपण की मिश्रित विधियां । इन विधियों की विशेषताएं, गुण व दोष।</p>
UNIT-II	<p>Profiles & Slope Analysis: Definition, types & drawing of profiles (Drawing of Profiles: Serial (at least four), Superimposed, Projected and Composite Profiles) and Vertical exaggeration of scale. Introduction of methods of Slope Analysis, Average Slope Determination by C.K.Wentworth's Method. Geospatial modelling of Relief Features: TIN & DEM (Analogue Study).</p> <p>परिच्छेदिका एवं ढाल विश्लेषण: परिभाषा, प्रकार एवं परिच्छेदिका निरूपण; (संक्रम परिच्छेदिकाए (कम से कम चार), अध्यारोपित परिच्छेदिका, प्रक्षिप्त परिच्छेदिका, मिश्र परिच्छेदिका। ऊर्ध्वाधर मापनी में विकृति ।</p> <p>ढाल विश्लेषण की विधियों का परिचय, सी.के.वेंटवर्थ की औसत ढाल निर्माण विधि, उच्चावच निरूपण हेतु भू-स्थानिक मॉडलिंग (TIN & DEM) (एनालॉग अध्ययन) ।</p>
UNIT-III	<p>Drainage Analysis: Methods of Stream Ordering, Bifurcation Ratio, Stream Frequency and Drainage Density.</p> <p>अपवाह तंत्र विश्लेषण: सरिता क्रम निर्धारण की विधियां, द्विभाजन अनुपात, सरिता आवृत्ति तथा अपवाह घनत्व।</p>
UNIT-IV	<p>Climatic Diagrams & Graphs:</p> <p>Diagrams (One dimensional): Wind Rose, Rainfall Dispersion Diagram, Water Budget Diagram and Hypsometric Curve.</p> <p>Graphs: Climograph, Hythergraph, Climatograph, Ergograph, Rainfall Variability graph, Temperature Variation graph and</p>

	<p>Altimetric Frequency Graph.</p> <p>जलवायवीय आरेख एवं आलेख: एक विमीय आरेख: पवन आरेख, वर्षा परिक्षेपण आरेख, जल-बजट आरेख तथा उच्चतादर्शी वक्र।</p> <p>आलेख: क्लाइमोग्राफ, हिदरग्राफ, क्लाइमेटोग्राफ, अग्रोग्राफ, वर्षा परिक्षेपण आरेख, तापमान विचरण आरेख तथा तुंगता आवृत्ति आलेख ।</p>
UNIT-V	<p>Weather symbols (weather condition, wind velocity and cloud cover) and Weather maps: introduction, uses, importance and interpretation of Indian weather maps (January and July). Isopleths on weather maps (Isotherms, Isobars, Isotachs, Isohyets).</p> <p>Introduction of Indian Portals for Climatic Data: Climatic Data Service Portal (CDSP), Indian Metrological Department (IMD), Pune, Meteorological & Oceanographic Satellite Data Archival Centre (MOSDAC).</p> <p>मौसम प्रतीक (मौसम की स्थिती, वायु का वेग और मेघ आवरण) । मौसम मानचित्र: परिचय , महत्व और भारतीय मौसम मानचित्र की व्याख्या (जनवरी तथा जुलाई) । मौसम मानचित्रों पर सममान रेखा (समताप रेखा, समदाब रेखा, समवाहगति रेखा, समवृष्टि रेखा)।</p> <p>जलवायु आकड़ों के लिए भारतीय पोर्टल का परिचय: जलवायु डेटा सेवा पोर्टल (सी. डी.एस.पी.), भारतीय मौसम विभाग पुणे, मौसम विज्ञान एवं समुद्र विज्ञान उपग्रह डेटा पुरालेख केन्द्र (एम.ओ.एस.डी.ए.सी.)।</p>
	<p>Exercises</p> <p>अभ्यास</p>
	<ol style="list-style-type: none"> 1. Representation of relief by Hachure method. 2. Representation of relief by Hill shading method. 3. Representation of relief by Trachographic method. 4. Representation of relief by Morphographic method. 5. Representation of relief by Spot height, Bench mark and Trigonometric stations. 6. Representation of relief by Form lines. 7. Representation of relief by Contour lines. 8. Drawing of Profiles: Serial (at least four). 9. Drawing of Profiles: Superimposed, Projected and Composite Profiles. 10. Determination of Average Slope by C.K.Wentworth's Method. 11. Mapping of Stream Ordering (For the given toposheet).

	<p>12. Mapping of Drainage Density Map.</p> <p>13. Drawing of Wind Rose Diagram.</p> <p>14. Drawing of Rainfall Dispersion Diagram.</p> <p>15. Drawing of Water Budget Diagram.</p> <p>16. Drawing of Hypsometric curve for the representation of relief features.</p> <p>17. Drawing of Climograph.</p> <p>18. Drawing of Hythergraph.</p> <p>19. Drawing of Climatograph.</p> <p>20. Drawing of Ergograph.</p> <p>21. Drawing of Rainfall Variability Graph.</p> <p>22. Drawing of Temperature Variation Graph.</p> <p>23. Drawing of Altimetric Frequency Graph.</p> <p>24. Drawing of Weather Symbols related to weather condition, wind velocity and cloud cover.</p> <p>25. Drawing of Indian Weather Map of January month and its interpretation.</p> <p>26. Drawing of Indian Weather Map of July month and its interpretation.</p> <p>27. Drawing of Isotherms, Isobars and Isohyets on the map.</p>
	<p>Suggested Readings सहायकग्रन्थ / सामग्री</p>
<p>Text Books</p>	<p>1. Mishra, R.N. and Sharma, P.K., Practical Geography Methods and Techniques, Pareek Publication, Jaipur 2023.</p> <p>2. Khullar, D.R., Essentials of Practical Geography, New Academic publication, Jalandhar 2000.</p> <p>3. Singh, R.L., Elements of Practical Geography, Kalyani Publication, New Delhi.</p> <p>4. Khan, M.Z.A., Text Book of Practical Geography, New Delhi 1998.</p> <p>5. Sarkar, A.K., Practical Geography-A Systematic Approach, Oriental Longman, Calcutta, 1997.</p> <p>6. जे.पी. शर्मा, प्रायोगिक भूगोल, रस्तोगी प्रकाशन, मेरठ, 2016.</p> <p>7. आर.एन.मिश्रा एवं पी.के. शर्मा, प्रायोगिक भूगोल, राज पब्लिकेशन नई दिल्ली, 2019.</p>

	<p>8. डी. आर. खुल्लर, प्रायोगिक भूगोल, कल्याणी पब्लिकेशन, 2019.</p> <p>9. डॉ. बी.सी. जाट, प्रायोगिक भूगोल, पंचशील प्रकाशन, जयपुर, 2020.</p> <p>10. इन्द्रपाल एवं माथुर, मानचित्र प्रक्षेप. राजस्थान हिन्दी ग्रंथ अकादमी, 2017.</p>
Reference Books	<p>1. Robinson, A.H. et.al, Elements of Geography, John Willey and Sons, U.S.A., 1995.</p> <p>2. Monkhouse, E.J. and Wilkinson, H.R., Map and Diagrams, Lethuen, London 1994</p>
Suggested E-resources	-----